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# FORTY-SIXTH ANNUAL REPORT

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OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE. an

## PART I.

REPORT OF THE PRESIDENT AND OTHER OFFICERS
FOR FISCAL YEAR ENDING NOV. 30, 1908.- 1912

JANUARY, 1909.

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# The Commonwealth of Massachusetts.

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Massachusetts Agricultural College,
Amherst, Dec. 1, 1908.

To His Excellency Eben S. Draper.

Sir: — I have the honor to transmit herewith, to Your Excellency and the Honorable Council, the forty-sixth annual report of the trustees of the Massachusetts Agricultural College, for the fiscal year ended Nov. 30, 1908.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
*President.*

# REPORT OF THE PRESIDENT OF THE COLLEGE.

*Gentlemen of the Corporation.*

I herewith submit my third annual report as president of the college.

## ATTENDANCE.

The attendance for the last college year exceeded that of the previous year by 25, and aggregated 246 four-years men and seven graduate students, with 245 in various short courses, or a total attendance of 498. The entering class in the autumn numbered 114, the largest previous freshman class being 88 in number. The total number of four-years men in present attendance is 263, and of graduate students 12. (See Table I.)

## APPROPRIATIONS.

The total amount of appropriations asked of the Legislature of 1908 was about $111,390; the total amount granted was $91,617 for the fiscal year, with a further increase of $7,000 for 1909 and subsequent years. (See Table II.)

## NEW GLASS HOUSES AND ATTACHED TEACHING BUILDING.

For several years the college has felt keenly the need of a range of modern glass houses adapted to instruction in commercial floriculture and market gardening. The need of a building suitable for teaching these branches has also been evident. The Legislature of 1908 made an appropriation of $34,000 for this purpose, the apportionment being approximately $15,000 for the instruction building, $17,000 for glass houses and $2,000 for the equipment of both. Plans for the range of greenhouses were drawn by Prof. E. A. White, with suggestions by the late W. W. Rawson of the Board of Trustees, and the contract for the construction was awarded to the Lord & Burnham Company, New York. The range is comprised as follows: —

Leading from the work room is a small house, 10 by 12 feet, which will be used for ferns. Next is a palm house 42 by 25 feet, to be used for the propagation and growth of the various varieties of palms. A narrow house for orchids, 10 by 12 feet, connects the palm house with the students' house, which is 50 by 26 feet. From the east end of the students' house an alley 12 by 112 feet serves to connect the other houses of the range; these are a violet house, a carnation house, a rose house, a tomato house and a cucumber house, each being 26 by 50 feet. The fern, palm, orchid, violet and students' houses, and the alley, are even span and of the iron type of construction; the other houses of the range are three-fourth span and of the half-iron type of construction. All are on concrete foundations, making a durable range. These houses will be heated by steam from the central heating plant.

The instruction building is a substantial two-story brick structure, with basement, designed by James H. Ritchie of Boston, and built by Allen Brothers of Amherst.

The basement contains a soil room, a cool room for bulbs, and storage rooms. The first floor contains a large laboratory with seating capacity for 50 students, a class room, coat room and office. The general work room for the glass houses joins the laboratory by double doors. On the second floor is a large class room with seating capacity for 100 students, a smaller class room, a room for the exhibition of greenhouse material and a janitor's room. The committee on buildings and grounds recommends that the building be known as "Henry F. French Hall," in honor of the first president of Massachusetts Agricultural College, and that the glass houses be called the "New Durfee Range of Glass Houses."

## Important Repairs to College Buildings.

On account of the numerous repair projects at the opening of the building season, it was thought necessary to secure a foreman to take charge of the work, and Mr. Clarence A. Jewett was made superintendent of buildings. Large additions were made to the power house. The roof was taken off and another floor added, bringing the top floor to a level with the embankment. This additional floor has been enlarged, and contains a room for the use of the fire apparatus, and a large room that has been fitted up with a lathe, saw and woodworking tools, and will be used exclusively for the carpenters. The next room below, the old shop, will be used principally for the steam fitting and plumbing work. The work of remodelling this building was finished in the early summer, at a cost of $2,104.17. This included a new pump and planer, which were much needed.

North dormitory was renovated from cellar to garret. It was found necessary to take off all the old lath and plaster, and metal ceilings were installed throughout, the side walls being relathed and plastered with pulp plaster. The building was rewired, and two new side fixtures and one center light were placed in each study room. All windows were fitted with large new sash and glass. Maple floors were laid throughout the building. The dormitory rooms on the fourth floor were arranged for the use of the Q. T. V. Fraternity, which had formerly used rooms on the first floor. The rooms on the first floor were remodelled, and include one large room for the use of the Social Union, and two rooms for student organizations. The basement of the west end has been fitted for the use of the college store and barber shop, the remaining space being given to the toilets and baths, except the extreme east end, which is unfinished.

The east experiment station has been thoroughly repaired. A large, new, fireproof vault, size 11 feet 2 inches by 12 feet 3 inches, with three floors, made of brick and concrete, has been placed in the building. New maple floors in all rooms and Puritan floors in both main hallways, concrete floors in basement and two new toilet rooms complete, together with the painting of all woodwork and walls, put the building in fairly good condition. Some necessary repairs have been made at the west station, including repairs to skylight, cement floors in basement, eave troughs around entire building, with conductors connected with a new tile drain, besides sundry small jobs.

Repairs to the library are still in progress. New cases have been added, increasing the shelf capacity nearly one-third.

Numerous other repairs have been made during the summer and fall, the principal ones of which are: slate roof and painting, two coats, to outside of farmhouse; slate roof on farm cottage; shingle roof to quarantine barn; a new set of shower baths and hand bowls, with a cement floor, for south dormitory; two hundred feet of tar walk; and a cement-testing room for the mathematical department.

## Commencement.

Commencement was held June 17, and the college conferred the degree of Bachelor of Science upon 58 persons, 2 of them being women; the degree of Master of Science upon 1 man; and the degree of Doctor of Philosophy upon 1. The class of 1908 is by far the largest class ever graduated in the history of the college, the nearest approach to it in size being the class of 1904, with 34 members, and the class of 1882, with 33 members. Alumni Day was made a special feature of the commencement exercises. A vigorous and scholarly Commencement address was given on the subject of "True and False Appeals in Agriculture," by Dr. Whitman H. Jordan, director of the New York Experiment Station at Geneva.

## The Summer School.

The summer school of 1908 presented several departures from the plan of 1907, these being mostly in the way of broadening the scope of the work: —

(1) A considerably larger number of courses was given. In 1907 the regular lecture courses numbered 4; in 1908 they numbered 19.

(2) The length of the school was extended from four weeks to six weeks.

(3) A separate and special effort was made to interest country clergymen in rural affairs. Four courses of lectures were offered for their especial benefit. This is probably the first attempt made in this country to offer a course of study on the rural problem to rural clergymen.

(4) The program included, further, a number of practical or technical courses designed more with reference to teaching practical matters than presenting subjects for direct use in school-rooms.

(5) This multiplication of courses rendered it necessary to

make all the work elective, and an effort was made to limit the amount of work taken by each pupil.

(6) The price of board and rooms furnished by the college was increased from $3 to $5 per week.

The increased cost of the course, assisted perhaps by other factors, reduced the attendance from 212 in 1907 to 168 in 1908.

A strong faculty was organized for the administration of these courses, including such eminent teachers as Prof. W. D. Hurd of the University of Maine, Prof. W. H. Dudley of the Wisconsin Normal School, Plattville, Wis., and Dr. T. N. Carver of Harvard. Several members of the faculty of Massachusetts Agricultural College also gave instruction.

There was a course of evening lectures and entertainments provided which proved interesting and valuable. Field exercises and excursions added much to the interest and value of the work.

Prof. F. A. Waugh, dean of the summer school, says: —

> Our experience in two years clearly suggests a few conclusions, which I may state as follows: —
>
> (1) There is a widespread and well-settled demand for the kind of work which we have to offer. This demand comes chiefly from teachers in the public schools.
>
> (2) This demand is strongest for technical courses, rather than for those dealing with theoretical or pedagogical subjects.
>
> (3) The most serious administrative problem connected with the summer school project is that of housing the pupils.
>
> (4) Some permanent form of organization should be established. One special object to be accomplished by such an organization is to offer a program of studies extending over three or four years, in order that pupils may return in successive years for the pursuit of a progressive course. Some further arrangement should be made also for co-operation between our summer school and the State normal schools.

## Changes in the Faculty and Other Officers.

By vote of the trustees, Dr. Charles A. Goessmann was made honorary professor of chemistry, as well as honorary director of the experiment station.

Prof. C. H. Fernald entered upon his duties as director of the graduate school in September. Professor Fernald, perhaps more than any other man on the faculty, has endeavored to develop interest in graduate work at this college, and it is peculiarly appropriate that he should become the first director of the new graduate school.

By vote of the trustees, the division of agriculture has been organized, and Prof. James A. Foord, who had served during the previous college year as assistant professor of agronomy, was made acting head of the division of agriculture and professor of farm administration.

Prof. Wm. P. Brooks, who had served as professor of agriculture since 1889, will now give practically all his time to his work as director of the experiment station, but retains a college lectureship in soil fertility. Professor Brooks has been in charge of the college agriculture during a period when agriculture as a subject has been developing in an unprecedented way. His wide knowledge of the working field of agriculture has been at the disposal of the people of the State, and has been incorporated into widely read books. He still retains his connection with the teaching work in a field which has been his specialty.

On January 7 Dr. A. Armagnac, instructor in French, died suddenly in his class room. Dr. Armagnac had been appointed only the autumn previous, but had won the thorough respect of faculty and students, and the suddenness of his death was a shock to the whole college population. His work was carried for the balance of the semester by Dr. Henry C. Lancaster of Amherst College, and on February 10 Mr. John A. Munson assumed the duties of instructor in French and served for the balance of the college year.

The instructorship in French made vacant by the resignation of Mr. Munson, in June, was filled by the appointment of Mr. Anderson Mackimmie. Mr. Mackimmie is a graduate of Princeton University, where his scholarship attracted special attention. He taught for five years in the public schools of Nova Scotia and for two years in Colchester Academy, Truro, N. S. He has also had an experience of three years of constant travel in Europe.

In July Miss Ella Frances Hall resigned as librarian. Miss Hall had been connected with the library since August, 1899, assisting President Goodell for several years, and since President Goodell's death had had charge of the library. She always maintained a thorough interest in her work, and had kept in touch with library methods. The place thus made vacant was filled by the appointment of Mr. Charles R. Green. Mr. Green is a graduate of the Connecticut Agricultural College, was employed for four years on the Hartford "Courant," and since 1901 had been connected with the Connecticut State Library at Hartford. Mr. Green has entered upon his duties with energy, has already changed the library shelving to accommodate a larger number of books, and has plans for substantial enlargement of the library facilities.

Mr. Haskell returned in September from his leave of absence, which was largely spent abroad.

The changes in the staff of the experiment station during the year have been as follows: —

Mr. Walter E. Dickinson resigned Dec. 5, 1907, to accept a position in a sugar factory in Cuba, and the vacancy was filled by the appointment, on January 1, of Mr. J. C. Reed, a graduate of the University of Vermont.

Mr. E. T. Ladd resigned as assistant in plant and animal chemistry Dec. 20, 1907, to accept another position. His place was taken January 1 by Mr. L. S. Walker, an employee of the station, and Mr. Walker's place was filled Jan. 1, 1908, by Mr. P. V. Goldsmith, a graduate of the Michigan Agricultural College.

Oct. 1, 1908, Mr. Carl S. Pomeroy, who had been for a year and a half assistant in horticulture, resigned to accept a fine position with the United States Department of Agriculture, and the vacancy was filled October 1 by the appointment of Mr. J. K. Shaw. Mr. Shaw has the degree of Bachelor of Science in Agriculture from the University of Vermont, and of Master of Science from the Massachusetts Agricultural College. He had previously served as instructor in horticulture at the New Hampshire College, as acting assistant professor of horticulture at the University of Missouri, and as assistant in plant breeding at the New Jersey Experiment Station.

In the summer Miss Grace M. Knowles, secretary to the president of the college, resigned after two years of efficient service, and Mr. Ralph J. Watts, a graduate of the college in the class of 1907, was appointed to the position.

In August Miss Clara L. Stuart of Boston entered upon the duties of correspondence clerk in the president's office, serving also the dean and the registrar in the same capacity.

In June Mr. E. G. Bartlett resigned as assistant in botany, to accept a position in Hawaii, and Mr. H. M. Jennison of the class of 1908 was appointed to the place.

Mr. W. M. Thornton, assistant in chemistry, resigned in June, and his place was filled by the appointment of Mr. L. I. Shaw, a graduate from Alfred University, with the degree of Master of Science from Syracuse University. Mr. Shaw had also served as assistant in chemistry both at Alfred and at Syracuse.

In October Mr. A. D. Holmes, assistant in chemistry, resigned to assume graduate work in the Johns-Hopkins University. The vacancy has not yet been filled.

### Appointments to New Positions in the Faculty.

The assistant professorship of physical education and hygiene was filled by the appointment of Dr. Percy L. Reynolds, a graduate from the physical director's course in the Springfield Training School. Dr. Reynolds has also received the degree of Doctor of Medicine from the University of Georgia, has had a seven years' experience as physical director in Young Men's Christian Association work, and for two years filled acceptably the directorship of physical training at the University of Maine.

In October Mr. Wm. P. B. Lockwood was elected assistant professor of dairying. Professor Lockwood graduated from the agricultural course of the Pennsylvania State College, has had two years' experience in handling high-class sanitary and modified milk with the Walker-Gordon Company, has spent three years in different branches of the condensed milk business, has taught in the short dairy and agricultural courses of the Pennsylvania State College, and has operated a condensed milk factory and creamery.

The position of instructor in agricultural education was filled by the appointment of Mr. Floyd B. Jenks, a graduate from the agricultural course at Purdue University. Mr. Jenks has had eight years' experience in teaching in elementary and secondary schools in both rural and city communities, as well as considerable experience in the management of farms.

The position of instructor in German was filled by the appointment of Mr. Edgar L. Ashley, who has the degree of both Bachelor of Arts and Master of Arts from Brown University. Mr. Ashley was instructor in German at Brown for three years, a student at the University of Heidelberg for one year, and instructor in German in charge of the department of German in Bates College, Maine, one year.

The position of instructor in agricultural economics has been filled by the appointment of Alexander E. Cance. Dr. Cance graduated from Macalester College in 1896, with the degree of Bachelor of Arts. He received the degree of Master of Arts from the University of Wisconsin in 1906 and the degree of Ph.D. from the University of Wisconsin in 1908. He has had considerable teaching experience, serving one year as teacher of high school Greek and history, one year as teacher of English in Gale College, Wisconsin, and one year as teacher of English and the sciences at Avalon College, Missouri. He was for three years principal of the Farm School at Asheville, N. C., and served one year as supervisor of practice at the First Pennsylvania State Normal School. Dr. Cance has specialized in economics and sociology, and is one of the few men of the country who have given particular attention to the economics of agriculture.

## GRADUATE SCHOOL.

A marked increase in the demand for thoroughly trained men has resulted in a corresponding increase in the number of graduate students at the college. That the graduate course could be improved by a more complete co-ordination and better organization has become evident, and accordingly the trustees established a graduate school at their meeting in June, and appointed Prof. C. H. Fernald director. Professor Fernald has been investigating the organization and requirements of similar schools in all parts of the country, by personal visits and correspondence, and a reorganization of the work here is now in progress. New subjects for graduate study will be added to those already offered, and the more complete separation of the graduate from the academic courses will certainly prove beneficial.

## Loss of the New Barn.

Early in the morning of August 15 fire was discovered in the storage part of the new farm barn. At the time of discovery it was under full headway, and entirely beyond control. Two students of our senior class, Mr. Wayne E. Geer and Mr. Myron F. Geer, who had been employed in the stable during the summer, and who roomed in the barn, narrowly escaped with their lives.

A brief statement of the losses caused by the fire follows: —

| | |
|---|---|
| Original cost of storage part, | $18,600 00 |
| Cost to remove débris (contractor's estimate), | 500 00 |
| Damage to silos, | 1,200 00 |
| Temporary shed to house feed, | 300 00 |
| Cattle, | 1,033 33 |
| Hay and other feeds and fertilizers, etc., | 4,023 40 |
| Equipment and sundry supplies, | 2,959 28 |
| Total, | $28,616 01 |

The Massachusetts District Police made an investigation as to the cause of the fire, but declared it to be unknown. Various theories as to its origin have been advanced, but no satisfactory explanation has been made.

Plans for a new structure will be submitted to you for your approval. I think that there is little doubt about the wisdom of housing implements and young stock in structures not connected with the barn for the storage of hay and grain.

## Insurance.

It is the understanding of the trustees that the Commonwealth does not permit a State institution such as ours to carry insurance on its buildings or property. Without attempting to enter into an argument concerning the wisdom of this arrangement, I desire to call your attention to the fact that this law works injustice to the institution, unless there accompanies it some plan by which a sinking or insurance fund is established by the Commonwealth, out of which losses such as that caused by our fire may be adjusted under ordinary insurance rules. Occasional fires of this kind are inevitable. Under the present plan, however, when we ask an appropriation from the Legislature to make good the loss, we face two unpleasant facts: first, that we have to wait until the Legislature meets, and until they have given due deliberation to the request; second, that the appropriation requested practically takes its place as a new call upon the State treasury, instead of payment of insurance, which it really is. By reason of the first fact, we are delayed in properly restoring our equipment; because of the second fact, we are delayed in properly developing the institution. I recommend, therefore, that the trustees petition the Legislature either to remove the restriction with regard to our taking insurance, or to create a State insurance fund, which may become available, under proper regulations, for fire losses at this and other institutions.

## Printing.

Under the act of the Legislature of 1908, the report of the trustees will hereafter be printed in four parts, as follows: —

| | |
|---|---|
| Part I. | Report of the president and other officers of the institution. |
| Part II. | The catalogue of the college. |
| Part III. | A popular report of the experiment station. |
| Part IV. | A detailed or scientific report of the experiment station. |

It is believed that this scheme of printing will not cost the State any more money than the old plan, and that it will give wider circulation to the report, as well as enable us to place these various reports in the hands of people most interested in the different parts of our work.

## Campus Enterprises.

The real life of the institution centers in the student body. It is not possible in a report of this type to describe all of the activities which go to make up the world of the college campus.

I wish, however, to call attention to several features of this life that have recently been developed.

There is appended to this report a list of the speakers for the past fiscal year, who have appeared at the weekly assemblies on Wednesday (attendance of students at these assemblies being required) and at the Sunday vespers, a voluntary service held in co-operation with the Young Men's Christian Association of the college. (See Table III.)

The organization of a department of physical education, with a director in charge, opens a useful line of activity among the men of the college. I bespeak for this department your deep interest and full support. In a later report I hope to discuss at some length the problem of physical education and athletics in a college such as ours.

The library facilities continue inadequate, but some steps have been taken to give partial relief. In the reading room connected with the library there have been placed additional tables and chairs, additional electric lights, a long list of periodicals is at hand, and a special library of attractive books is available for the constant use of the students. In the library itself study tables have been provided and additional shelving has been placed in position. We cannot, however, deny the pressing need of a modern, fireproof building, fully adequate to the use of students.

The newest enterprise of the college campus which concerns the student body directly is the organization of the M. A. C. Social Union. Quarters in North College have been provided for the Union, which include a large assembly or lounging room, an office for the editors of the "College Signal," a committee room for the use of the officers of the various student organizations, and the present headquarters of the assistant professor of physical education and hygiene. The students themselves have purchased a piano and furniture; the college heats and lights the rooms and pays for janitor service. The college also assists in furnishing some of the entertainments provided by the Union. The whole purpose of the Union is to draw together the members of the student body, as well as to aid in bringing the entire population of the college into a larger fraternity.

## Financial Aid for Students.

This college is still a "poor man's college." Many of the students "work their way" through without any outside aid whatever. Nevertheless, there are indications of a tendency toward a change. In the first place, the cost of living increases somewhat. Within two years we have been obliged to raise the price of board from $3.25 per week to $3.75, and at the last figure we are barely meeting the cost. We house less than 100 men on the campus, so that nearly two-thirds of the students must seek rooms in private houses. Apparently the cost of room rent is gradually going up. As the college grows and student enterprises increase, the cost to the individual student of supporting these enterprises has a tendency to advance. On the other hand, owing largely to the increase in students, there is a decreased opportunity for labor. The amount of labor about the institution available for students is of course limited. We do all we can to give work to competent men.

I do not wish to imply that conditions are as yet serious, but I fear that tendencies are at work which will make the cost to the average student more than he can afford; and it is possible also that the standard set by students not dependent on their own resources will more and more be the standard for the college. Before the situation becomes acute, I think we ought to consider the whole problem, so that we may avoid any tendency in our college life which shall make it more difficult for the student without means to complete his course here. I therefore recommend that the trustees designate a special committee, to be composed both of members of the trustees and members of the faculty, possibly to work in conjunction with representatives of the alumni and of the student body, to make a careful study of this question and to report to the trustees at some future time.

## The Housing of Students.

One of the phases of the problem just referred to is the housing of students. There are rooms on the college campus for not to exceed 100 men. There are at present in the college

260 undergraduates, so that more than half of these live in private houses. Without entering at this present time into any discussion of the question of building dormitories, I wish to call your attention to the fact that circumstances make it necessary for the college to declare its policy on this subject. If the students are to be housed in private buildings, the owners of property in Amherst must in some way be encouraged to increase the number of houses available for such purpose. On the other hand, if the college is likely to adopt the policy of housing a large proportion of its students in dormitories, it is only fair to these people that they should be advised of the fact.

I recommend, therefore, that the trustees authorize the committee on buildings and grounds to make a special study of the whole problem of the housing of students, and report a definite recommendation at some future time.

## Visiting Other Institutions.

Each institution must work out its own problem, in the light of its purpose, its history and its environment; nevertheless, each institution can learn from other institutions. Much of this information can be gathered from a study of catalogues and by correspondence; but especially in a college like ours, where the subjects of study are developing with great rapidity, where new methods must be constantly devised and new courses must be constantly added, it becomes extremely desirable that those most particularly charged with the administration of the institution shall be able to come into rather intimate touch with the work of similar institutions.

I desire to recommend that it become the settled policy of the trustees, therefore, to permit and encourage visitation of other colleges by members of the trustees and of the faculty, under such limitations and regulations as may seem wise.

## The Development of the Grounds.

Four years ago the trustees passed a resolution organizing a commission on buildings and grounds, to be composed of the trustees' committee on new buildings and arrangement of grounds, with the addition of two members of the faculty. This commission was organized definitely two years ago, under the chairmanship of the late Mr. Draper. During this period it has had under consideration the general problem of the future development of the grounds, the location and architecture of the buildings, a system of sewage disposal and other questions connected with the general problem.

The commission has had the expert assistance of Mr. Frank Irving Cooper and the constant and specific advice of Prof. F. A. Waugh; and finally made arrangements with Mr. Warren H. Manning, the noted landscape designer of Boston, for the study of the entire problem. Mr. Manning has reported a general plan, which has been accepted by the commission, and as soon as further details are decided it is expected that the plan will be made public and thrown open for discussion.

## Athletic Field.

Some fourteen years ago there was organized an association among the alumni of the college for the specific purpose of raising funds for the purchase of an enclosed athletic field for the use of the students of the college. A sum of money has been collected, but for various reasons the project has not come to a conclusion. During the past year a careful study of the problem has been made, and it now seems altogether advisable that the college shall own and control the athletic field. The Alumni Athletic Association will then be ready to turn its energies and funds into the proper equipment of the field for the use of the undergraduates. I think this arrangement is a most happy one.

I wish to call your attention to the fact, however, that on land at present owned by the college there is no place fully adequate to the demands of an athletic field. I trust that the need for this field and the need of land on which to place it may be vigorously set before the incoming Legislature, in order that we may bring this whole matter to an early conclusion. It is extremely desirable from every point of view that this field should become a permanent feature of our department of physical education.

## FURTHER NEEDS OF THE COLLEGE.

### *1. Building for the Departments of Zoölogy and Entomology.*

A year ago I called your attention to the need for better housing for these departments. This need for room is becoming pressing, nearly twice as many men electing entomology as the laboratory will accommodate. From the standpoint of protecting valuable property, a new building is, I think, imperative. In accordance with your vote, the committee on buildings has had plans prepared for a structure that will house both departments in an adequate fashion. In the judgment of the committee, this building should be of fireproof construction throughout. I am sure, also, that it is the judgment of the committee that it should be the accepted policy of the college to plan in the future for fireproof buildings only, — except of course for certain minor structures, such as small barns, etc. I trust that the Legislature of 1909 may be persuaded to grant our full request, in order that we may build in worthy fashion for these important departments.

### *2. Buildings for the Division of Agriculture.*

I have already referred to the desirability of housing young stock in a structure separate from the storage barn; I have the same recommendation in regard to tools and machinery. If the Legislature reimburses the college for the fire loss, the money thus available may possibly enable us to build these two structures in addition to the storage barn; but if it does not, I think we should ask for a special appropriation to complete these two structures during the coming summer.

One of the neglected fields in our agricultural work has been instruction in poultry keeping. I am informed that the State of Massachusetts consumes about $25,000,000 worth of poultry products annually, and produces only about $5,000,000 worth. It is perfectly obvious that this industry may be made one of the large factors in Massachusetts agriculture, but it needs the leadership of the college, in instruction at the institution and other extension work. I strongly recommend, therefore, asking the Legislature for a sufficient amount of money to establish a department of poultry husbandry, including an item of perhaps $5,000 for a set of buildings adapted to instruction in poultry keeping, both to the college students and to short-course students.

I think it is also important that we should begin instruction in what we may call for the present farm mechanics, but which ought to develop finally into a department of agricultural engineering, covering all of the construction and engineering work that come up in the management of a farm or in the development of rural communities. I recommend that we endeavor to establish farm mechanics work during the next college year, and that we ask the Legislature for funds both for instruction and for a small outfit of tools and machines, in order that a beginning may be made.

The live stock interests of Massachusetts are hardly comparable with those of the great western States, in which the agricultural colleges have made a large feature of animal husbandry; nevertheless, it would be fatal to neglect securing a strong department of animal husbandry in this college. Furthermore, the dairy interest is bound to play a permanent and large part in Massachusetts agriculture. Whether we consider the matter from the dairyman's point of view, or as a phase of animal husbandry teaching, we need to give good instruction in stock judging. At present we have no place where this can be done. A small stock-judging pavilion is therefore necessary, and I recommend that an item for such a building be placed in our legislative budget.

I have before called your attention to the need of a very large development, in the immediate future, of our division of agriculture. I do not wish to be critical, but it is a simple statement of fact to say that, so far as the equipment, buildings, laboratories and apparatus for teaching modern technical agriculture are concerned, this college at present not only fails to rank with the stronger agricultural colleges, but, aside from the new stable, we can hardly make a good comparison with the smaller of our agricultural colleges. We cannot hope to impress upon our students the importance of agriculture, when we have so meager facilities for teaching it. I think the college has been quite wise in its selection of new structures during the buildings era which began seven or eight years ago, but the time has arrived when we can no longer ignore agriculture.

I therefore recommend with great emphasis that the committee on farm and horticulture, acting of course with Professor Foord and with the committee on buildings, be requested to have plans prepared during the year for a suitable dairy building. This building should be large enough to provide for this important work for several years to come, and should be adapted to instruction both in butter dairying and in milk dairying, and adapted, also, to instruction for both college students and short-course students.

I recommend also that the committee on buildings be requested, acting also with Professor Foord, to have plans prepared for an instruction building designed to house the division of agriculture. I think the suggestion that has been made informally by Mr. Bowker, that such a building should be called "Stockbridge Hall," is entirely appropriate; and I believe that we should ask for a building worthy of the agriculture of Massachusetts and worthy the man whose name it may bear. Personally, I believe that we should plan for a building to cost not less than $150,000. It should contain offices, laboratories and class rooms sufficient for a division very much larger than at present exists. If it seems unwise to ask for so large a sum at once, I think we should still make our plans comprehensive, but of such a character that perhaps half the building could be constructed under a single appropriation, the other half to be added when the needs of the division make it imperative.

### 3. *Miscellaneous Building and Repair Needs.*

I again recommend that we ask the Legislature for a fruit storage house for the department of pomology.

I also wish to emphasize the pressing need of a new dynamo. The last Legislature refused to make an appropriation for this purpose. The old dynamo has practically given out, and we are paying in the neighborhood of $250 a month for electric lights, whereas with our own dynamo the cost per month would be trivial. It is a very short-sighted business policy that compels us to continue this plan.

The addition of Clark Hall and the new glass houses, with the new teaching building connected therewith, will tax the capacity of the heating plant. As other structures are likely to be added to the group of buildings on the east side of the campus, and particularly if we are to have the new building for entomology, the question of proper extension of the heating plant becomes of prime importance; steps should be taken to carry out such an extension.

I think that all the departments have been feeling the handicap of meager equipment, and, while it is possible that the present requests from these departments aggregate a rather large sum, I do not think that they represent an extravagant policy.

North College still needs further attention. The work done this last season has revolutionized the interior aspect of the building. The students thoroughly appreciate the opportunities offered by the new Social Union, and I think we ought to utilize the entire basement in such a way as to provide further facilities in the development of a social center.

Practically all of the frame buildings on the campus very much need repainting, and some of the brick buildings need trimming. I recommend that we ask the Legislature for a sum sufficient to do this, and that, if this sum is granted, we ask a competent architect to outline a scheme of colors for the various buildings, which shall, if possible, give a more pleasing effect than prevails at the present time.

The trustees recognize, of course, that the newly organized department of physical education has absolutely no equipment for its work. I therefore recommend that the interior of the drill hall be refitted as a gymnasium in such a way as not to interfere with its use as a drill hall, and that the department of physical education be given a reasonable equipment of gymnasium apparatus.

### *4. Increase of Amount of Annual Income.*

I am quite aware that the last Legislature made a fairly substantial increase in the amount of funds coming to us from the Commonwealth each year. I have no thought that we are to need large annual increases perpetually, although of course the needs of the college are bound to expand; but we must remember that for a number of years the college failed to expand in the matter of new departments, particularly at a time when the leading agricultural colleges were growing at an extremely rapid rate. I think it is perfectly clear, therefore, that we need, as it were, to "catch up," so I have no hesitation in recommending that we ask the incoming Legislature for a very substantial addition to our annual income.

In the matter of new instruction, for instance, I think we should have a professor of forestry. I suppose that I have had more letters from prospective students asking about forestry instruction here than on any other subject. Quite a large percentage of the present freshman class, in declaring their proposed vocation, named forestry. The Commonwealth is taking active steps to solve the forestry problem. We cannot afford to linger behind on the educational side.

I have already referred to the need for departments of poultry husbandry and farm mechanics; I would also suggest the desirability of securing a man to develop a department of rural sociology. I have for many years been convinced that a college of agriculture ought to emphasize the economic and social aspects of agriculture fully as much as the production and scientific aspects. My recent trip with the Commission on Country Life gave me a new emphasis upon this side of our work. I strongly urge that we try to secure such a man.

The head of the division of the humanities desires to develop much more completely than it has ever been possible to do heretofore the work of public speaking, and I endorse cordially his recommendation that he be given opportunity to employ a man who will become instructor in public speaking. Our students need this work and desire it, and it is too important to be overlooked.

With the growth of the freshman class, the large increases in our senior classes and the development of new departments, there are several assistants needed in the teaching and clerical work. I estimate that we need for the college year of 1909–10 at least $13,000 more than we are now receiving for instruction purposes.

We have organized a graduate school, and I recommend that we ask the Legislature for not less than $5,000 a year for the purpose of carrying on this most important work.

The college budget will show that, although our apportionment to departments is considerably larger than last year, we shall be enabled to carry that increase safely for the present fiscal year. At the beginning of another fiscal year, however, unless we have a substantial increase in our maintenance item, we shall face a serious deficit. The department of general maintenance, supervised by the treasurer of the college, asks this year for $17,300 net. Our coal bill alone is nearly $9,500. The $15,000 arising from scholarships must go into equipment and maintenance of the academic departments of the college. I think, therefore, that we ought to ask the Legislature to increase the maintenance item from $7,000 to $20,000 a year.

We should begin the work of making an agricultural survey of Massachusetts. The departments of floriculture and market gardening are prepared to make a survey of the greenhouse industry. The department of pomology is ready to undertake an orchard survey of the State, and the department of farm administration desires to investigate farm management in Massachusetts. This work is just as vital to the development of adequate teaching as the research work of our experiment station, and I strongly recommend that steps be taken to secure a small fund for this purpose.

I also believe that we should gradually extend the scope of our short-course work. I wish that another autumn we might undertake, in a small and experimental way, several projects looking toward leadership of the college among the working farmers of the State. I think we ought to enlarge our short-course work at the college; and, still further, that we should heed the constant calls coming to us from farmers, from clergymen, from teachers and from students in the Young Men's Christian Association schools for correspondence courses; that we should more completely organize the work of our teachers who are asked to lecture away from the college; that we should prepare leaflets on agricultural subjects, particularly for young people who are looking to us for agricultural instruction; that we should organize a series of educational exhibits at the agricultural fairs of the State; that we should renew the efforts for better-farming railway trains and for trolley car exhibits; that we should experiment with travelling schools in horticulture and poultry keeping; and that we should at once begin to organize the co-operative demonstration work in different parts of the Commonwealth.

There are other minor recommendations for improvement and equipment, but I have perhaps even now gone too fully into details. I do plead, however, most urgently for a legislative appropriation which will enable us to develop the college in the immediate future to something like its normal equipment.

### Obituary.

It becomes my duty to chronicle the death of Mr. W. W. Rawson, who passed away Aug. 9, 1908. Mr. Rawson was appointed to the Board of Trustees by Governor Guild in January of this year. His term of service was thus very brief, but his success in his own business of gardening, his political acquaintance and accomplishments, his leadership among the gardeners and florists of the State, his vigor of mind and practical business instinct and his sterling integrity, would have been, had he lived, splendid assets for the college.

Respectfully submitted,

KENYON L. BUTTERFIELD.

Amherst, Mass., Nov. 30, 1908.

# STATISTICS OF THE COLLEGE.

## TABLE I. — *Attendance.*

| | For Year ending June 30, 1908. | | For Year ending Nov. 30, 1908. | |
|---|---|---|---|---|
| Graduate students, | | 7 | | 12 |
| Senior class, | 58 | | 49 | |
| Junior class, | 54 | | 48 | |
| Sophomore class, | 47 | | 52 | |
| Freshman class, | 87 | 246 | 114 | 263 |
| Short courses: — | | | | |
| Winter course, 1908, | 32 | | 32 | |
| Bee course, 1908, | 3[1] | | 3 | |
| Summer school, | 210[2] | 245 | 168[3] | 203 |
| Total, | | 498 | | 478 |

[1] Not in regular course. [2] 1907. [3] 1908.

## TABLE II. — *Legislative Budget, 1908.*

| | Asked. | Granted. |
|---|---|---|
| *I. Deficiency Appropriations.* | | |
| 1. Deficit in current funds, | $13,000 00 | |
| 2. Deficit in cost of barn, | 3,690 10 | |
| Total, | $16,690 10 | $23,617 04[1] |
| *II. Increase in Current Annual Appropriation.* | | |
| 3. Increase in maintenance, to cover regular apportionment, | $2,000 00 | $2,000 00 |
| 4. Increase in instruction appropriation, | 13,000 00 | 13,000 00 |
| 5. Increase in current annual appropriation, to cover cost of short courses and correspondence courses, | 8,000 00 | 5,000 00 |
| Total, | $23,000 00 | $20,000 00[2] |
| *III. Special Apportionment.* | | |
| 6. Target range and equipment, | $1,000 00 | $1,000 00 |
| 7. Repairing and refitting experiment station buildings, | 4,000 00 | 4,000 00 |
| 8. Addition to electric light plant, | 6,000 00 | – |
| 9. Repairing and refitting North College, | 6,000 00 | 6,000 00 |
| 10. Enlargement and improvement of library facilities, | 2,500 00 | 1,000 00 |
| 11. Department equipment, | 8,000 00 | 4,000 00 |
| 12. Miscellaneous repairs and minor improvements, | 7,700 00 | 5,000 00 |
| 13. Fruit storage house, | 2,500 00 | – |
| 14. Glass houses, attached teaching building and equipment for same, | 34,000 00 | 34,000 00 |
| Total, | $71,700 00 | $55,000 00 |
| Grand total, | 111,390 10 | 98,617 04[3] |

[1] Provided also for deficit in dining hall, $3,187.77; and in Burnham fund, $3,000.

[2] For 1908, $13,000.

[3] For 1908, $91,617.04.

### TABLE III. — *Speakers for the Year.*

*Speakers at Assemblies for Year ending Nov. 30, 1908.*

1907.
Dec. 4. — Mr. William E. Spencer, Amherst.
1908.
Feb. 12. — Rev. Calvin Stebbins, Framingham.
Feb. 19. — Mr. J. H. Hale, South Glastonbury, Conn.
Mar. 11. — Mr. E. C. Mercer, New York, N. Y.
Mar. 18. — Mr. Edwin D. Mead, Boston.
May 6. — Dr. Howard Edwards, Kingston, R. I.
May 13. — Rev. Ora Samuel Gray, Amherst.
Sept. 30. — Mr. Henry Bond, Greenfield.
Oct. 7. — Mr. Horatio Knox, Providence, R. I.
Oct. 21. — President George E. Fellows, Orono, Me.
Nov. 4. — Director Rufus W. Stimson, Northampton.
Nov. 11. — Dr. George W. Tupper, Boston.

*Speakers at Vesper Services for Year ending Nov. 30, 1908.*

1907.
Dec. 8. — Rev. Ozora S. Davis, New Britain, Conn.
Dec. 15. — Rev. J. Ross Stevenson, Fifth Avenue Church, New York, N. Y.
1908.
Jan. 5. — Rev. A. P. Reccord, Springfield.
Jan. 12. — Prof. H. A. Bridgeman, "Congregationalist."
Jan. 19. — Rev. Arthur A. Coar, Springfield.
Jan. 26. — Rev. Willis H. Butler, Northampton.
Mar. 1. — Rev. J. G. Nichols, South Hadley.
Mar. 8. — Rev. Samuel Eliot, Boston.
Mar. 15. — Rev. F. L. Goodspeed, Springfield.
Mar. 22. — Mr. F. L. Willis, Worcester.
Sept. 27. — Rev. Philip S. Moxom, Springfield.
Oct. 4. — Rev. Ora Samuel Gray, Amherst.
Oct. 11. — Rev. John C. Breaker, Northampton.
Oct. 18. — Mr. F. L. Willis, Worcester.
Oct. 25. — Rev. Edward F. Sanderson, Providence, R. I.
Nov. 1. — Dr. Lyman Abbott, New York, N. Y.
Nov. 8. — Dr. W. W. Fenn, Cambridge.
Nov. 15. — Dr. William E. Barton, Chicago, Ill.
Nov. 22. — Rev. C. L. White, New York, N. Y.

## TABLE IV. — *Students entering College in the Autumn of 1908.*

### *Occupations of Fathers.*

| OCCUPATIONS. | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture, | 23 | 19.00 |
| Professional, | 9 | 8.00 |
| Business, | 27 | 22.50 |
| Artisans, | 17 | 14.16 |
| Miscellaneous, | 32 | 26.00 |
| Deceased, | 12 | 10.00 |

### *Intended Vocations.*

| VOCATIONS. | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture (practical), | 28 | 23.33 |
| Agriculture (scientific), | 56 | 46.67 |
| Teaching, | 1 | .83 |
| Engineering, | 18 | 15.00 |
| Miscellaneous, | 2 | 1.67 |
| Undecided, | 15 | 12.50 |

### *Religious Census.*

| DENOMINATION. | MEMBERSHIP. | | PREFERENCE. | | TOTAL. | |
|---|---|---|---|---|---|---|
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. |
| Baptist, | 2 | 1.67 | 6 | 5.00 | 8 | 6.67 |
| Catholic, | 21 | 17.50 | – | – | 21 | 17.50 |
| Congregational, | 23 | 19.17 | 21 | 17.50 | 44 | 36.67 |
| Episcopal, | 4 | 3.33 | 4 | 3.33 | 8 | 6.67 |
| Methodist, | 6 | 5.00 | 4 | 3.33 | 10 | 8.33 |
| Unitarian, | 3 | 2.50 | 6 | 5.00 | 9 | 7.50 |
| Universalist, | 3 | 2.50 | 3 | 2.50 | 6 | 5.00 |
| Miscellaneous, | 2 | 1.67 | 12 | 10.00 | 14 | 11.67 |
| Total, | 64 | 53.34 | 56 | 46.66 | 120 | 100.01 |

### *Miscellaneous Statistics.*

| | |
|---|---|
| Average age (freshmen only), | 19 years. |
| Number applying for student labor, | 69; 57.5 per cent. |
| Number boarding at Draper Hall, | 97; 80.8 per cent. |

### *Home Addresses.*

| | | | |
|---|---|---|---|
| Abington, | 1 | Canton, | 1 |
| Alandar, | 1 | Chelsea, | 1 |
| Amherst, | 14 | China, | 1 |
| Arlington, | 1 | Clifford, | 1 |
| Ashburnham, | 1 | Concord, | 1 |
| Attleborough, | 1 | Cumberland, | 1 |
| Bernardston, | 1 | Chester, | 1 |
| Billerica, | 1 | Danvers, | 1 |
| Boston, | 7 | Dorchester, | 2 |
| Brockton, | 2 | Easthampton, | 1 |
| Brooklyn, N. Y., | 1 | East Wareham, | 1 |
| Buckland, | 1 | Elkhart, Ind., | 1 |
| Buffalo, N. Y., | 1 | Fall River, | 2 |
| Cambridge, | 1 | Greenwich Village, | 1 |

TABLE IV. — *Students entering College in the Autumn of 1908* — Concluded.

*Home Addresses* — Concluded.

| | | | |
|---|---|---|---|
| Hingham, | 1 | Pittsfield, | 1 |
| Holden, | 1 | Revere, | 1 |
| Holyoke, | 2 | Ringville, | 1 |
| Hopedale, | 1 | Roxbury, | 2 |
| Jamaica Plain, | 2 | Seattle, Wash., | 1 |
| Leicester, | 1 | Shelburne Falls, | 1 |
| Leominster, | 1 | Somerville, | 1 |
| Littlefalls, N. Y., | 1 | South Hadley Falls, | 1 |
| Lowell, | 1 | South Lincoln, | 1 |
| Lynn, | 1 | Stow, | 1 |
| Marlborough, | 4 | Sturbridge, | 1 |
| Melrose Highlands, | 1 | Sunderland, | 1 |
| Medfield, | 1 | Turners Falls, | 3 |
| Medford, | 2 | Taunton, | 2 |
| Natick, | 2 | Wakefield, | 1 |
| New Haven, Conn., | 1 | Waterbury, Conn., | 1 |
| Newton, | 1 | Watertown, | 1 |
| New York, N. Y., | 2 | Wayland, | 1 |
| North Abington, | 1 | Weathersfield, Conn., | 1 |
| North Adams, | 1 | Wenham, | 1 |
| North Leverett, | 1 | West Barnstable, | 1 |
| North Reading, | 1 | Westhampton, | 1 |
| North Wilmington, | 1 | Williamsburg, | 1 |
| Orange, | 1 | Winchester, | 2 |
| Osterville, | 1 | Worcester, | 6 |
| Otego, N. Y., | 1 | | |

# GIFTS, 1908.

The most notable gift of the year was the legacy of Mrs. Louisa M. Baker, a long-time friend of the college, who left the sum of $6,000 to be held in trust by the college, the income to be used for the aid of needy students. It is needless to say that so long as a large proportion of our students are dependent to a greater or less degree upon their own resources, this gift can be used to good advantage. Other gifts are: —

Dr. GEORGE W. RAWSON, Amherst: seventeen volumes of medical books and a collection of histological specimens, to the veterinary department.

AMERICAN COAL PRODUCTS COMPANY, 17 Battery Place, New York, N. Y.: five hundred pounds ammonium sulfate.

THE BOSTON POULTRY DRY FEED HOPPER COMPANY, 62 Causeway Street, Boston: two dry feed hoppers.

BOWKER FERTILIZER COMPANY, 43 Chatham Street, Boston: one-half ton high-grade Stockbridge fertilizer.

Mr. EDWARD F. CAMERON, Helena, Mont.: one Lightning Dandelion Exterminator.

CYPHERS INCUBATOR COMPANY, Buffalo, N. Y.: four thermometers for incubators; four brooder thermometers.

THE ALBERT DICKINSON COMPANY, Chicago, Ill.: samples of grass seeds.

EARP-THOMAS FARMOGERM COMPANY, 233 Washington Street, Bloomfield, N. J.: cultures for peas, beans and sweet peas; samples Farmogerm for peas, beans, sweet peas and alfalfa.

GERMAN KALI WORKS, 93 Nassau Street, New York, N. Y.: one ton kainit; one ton muriate of potash; two tons sulfate of potash; one ton sulfate of potash magnesia.

JAMES J. H. GREGORY & SON, Marblehead: four pounds Eldorado potatoes; four pounds Early King potatoes; four pounds Big Copper potatoes.

J. W. GUERNEY, Cummington: one peck Beauty of Hebron potatoes for seed.

E. L. HAHN & CO., Muscatine, Ia.: fertilizer distributer.

PETER HENDERSON & CO., 35 and 37 Cortlandt Street, New York, N. Y.: twenty-one samples of grass for trial grounds.

The New England Gas and Coke Company, Shawmut Bank building, Boston: one thousand pounds sulfate of ammonia.

Henry Nungesser & Co., 63 and 65 Pearl Street, New York, N. Y.: samples of grass for grass garden.

Dr. David Roberts Veterinary Company, Waukesha, Wis.: book, "Abortion in Cows."

Rockland-Rockport Lime Company, Rockland, Me.: one barrel "Pine Cone" hydrate of lime.

The Massachusetts Society for Promoting Agriculture: prizes for short courses: For best work during the course, three prizes, — $50, $30 and $20. For best butter made by students, three prizes, — $25, $15 and $10. For excellence in stock judging, four prizes, — $10, $7.50, $5 and $2.50.

The Bowker Fertilizer Company, Boston: one-half ton Stockbridge fertilizer as prize in short courses.

B. von Herff, German Kali Works, New York, N. Y.: one ton kainit as prize in short courses.

### Loans, 1908.

Vermont Farm Machine Company, Bellows Falls, Vt.: one No. 4 Separator; one No. 6 Separator.

D. H. Burrell & Co., Little Falls, N. Y.: one No. 2 Simplex Separator.

De Laval Separator Company, New York, N. Y.: one Acme Turbine Separator; one Baby No. 3 Separator; one No. 12 Separator.

Sharples Separator Company, West Chester, Pa.: one No. 4 Tubular Hand Separator; one No. 10 Tubular Steam Separator.

Empire Cream Separator Company, Bloomfield, N. J.: one Empire No. 1 Separator.

Stoddard Manufacturing Company, Rutland, Vt.: one 24-bottle Wizard Turbine Tester.

Iowa Separator Company, Waterloo, Ia.: one No. 3 Separator.

International Harvester Company, Chicago, Ill.: one No. 3 Separator.

Sears, Roebuck & Co., Chicago, Ill.: one No. 6 "Economy" Separator.

# REPORT OF THE TREASURER

## FOR THE FISCAL YEAR ENDING NOV. 30, 1908.

### BALANCE SHEET.

| | | | Dr. | Cr. |
|---|---|---|---|---|
| **1907.** | | | | |
| Dec. 1. | To cash on hand, | | $558 00 | – |
| | By First National Bank (overdraft), | | – | $7,858 00 |
| **1908.** | | | | |
| Nov. 30. | To special appropriation receipts, State Treasurer, | | 76,843 71 | – |
| | By special appropriation disbursements, | | – | 80,794 59 |
| | To experiment station receipts, | | 52,211 23 | – |
| | From State Treasurer, | $10,500 00 | | |
| | From U. S. Treasurer, | 25,000 00 | | |
| | From other sources, | 16,711 23 | | |
| | By experiment station disbursements, | | – | 52,650 37 |
| | To current accounts receipts, | | 141,641 98 | – |
| | From U. S. Treasurer, Morrill fund, | $16,666 67 | | |
| | From U. S. Treasurer, Nelson Fund, | 6,666 66 | | |
| | From State Treasurer, endowment fund, | 10,613 32 | | |
| | From State Treasurer, maintenance, | 11,500 00 | | |
| | From State Treasurer, scholarship, | 15,000 00 | | |
| | From State Treasurer, instruction, | 21,500 00 | | |
| | From State Treasurer, short courses, | 3,750 00 | | |
| | From State Treasurer, Burnham emergency, | 3,000 00 | | |
| | From State Treasurer, deficit, | 13,739 17 | | |
| | From State Treasurer, veterinary, | 1,000 00 | | |
| | From State Treasurer, heat and light, | 500 00 | | |
| | From other sources, | 37,706 16 | | |
| | By current accounts disbursements, | | – | 131,088 63 |
| | To student trust funds receipts, | | 37,996 67 | – |
| | By student trust funds disbursements, | | – | 38,829 42 |
| | By cash on hand, | | – | 1,817 75 |
| | To First National Bank (overdraft), | | 3,787 17 | – |
| | | | $313,038 76 | $313,038 76 |

| | Balance Sheet, Dec. 1, 1907. | | Transactions, Dec. 1, 1907, to Nov. 30, 1908. | | Balance Sheet, Nov. 30, 1908. | |
|---|---|---|---|---|---|---|
| | Dr. | Cr. | Dr. | Cr. | Dr. | Cr. |
| Cash on hand, | $558 00 | – | – | $1,259 75 | $1,817 75 | – |
| Cash on deposit (overdraft), | – | $7,858 00 | – | 4,070 83 | – | $3,787 17 |
| Experiment station, | – | 5,719 94 | $52,211 23 | 52,650 37 | – | 5,280 80 |
| Special appropriation, | 15,009 42 | – | 76,843 71 | 80,794 59 | 18,960 30 | – |
| Trust funds, | 818 22 | – | 37,996 67 | 38,829 42 | 1,650 97 | – |
| Current accounts, | – | 2,807 70 | 141,641 98 | 131,088 63 | – | 13,361 05 |
| Totals, | $16,385 64 | $16,385 64 | $308,693 59 | $308,693 59 | $22,429 02 | $22,429 02 |

## STATEMENT OF THE FIRST NATIONAL BANK WITH THE MASSACHUSETTS AGRICULTURAL COLLEGE.

| | | Dr. | Cr. |
|---|---|---|---|
| 1907.<br>Dec. 1. | Balance on hand, | $2,513 44[1] | – |
| 1908.<br>Nov. 30. | Deposits, | 302,376 92 | – |
| | Interest, | 285 54 | – |
| | Disbursements as per warrants paid, | – | $293,984 31 |
| | Balance on hand, | – | 11,191 59[1] |
| | | $305,175 90 | $305,175 90 |

---

[1] These amounts are greater Dec. 1, 1907, by $10,371.44, and Nov. 30, 1908, by $14,978.76, on account of outstanding drafts.

## STATEMENT OF SPECIAL APPROPRIATION ACCOUNTS.

| NAME OF APPROPRIATION. | Date. | Total Appropriation. | Amount expended to Date. | Balance unexpended Nov. 30, 1908. |
|---|---|---|---|---|
| Horticultural building, | 1905 | $39,950 00 | $39,950 00 | – |
| Clark Hall, | 1906 | 45,000 00 | 45,000 00 | – |
| Chemical appropriation, | 1906 | 1,000 00 | 1,000 00 | – |
| Clark Hall equipment, | 1907 | 24,400 00 | 24,400 00 | – |
| Dairy equipment, | 1907 | 3,000 00 | 3,000 00 | – |
| Live stock, | 1907 | 4,000 00 | 4,000 00 | – |
| Omnibus, | 1907 | 14,000 00 | 14,000 00 | – |
| New boiler, | 1907 | 2,000 00 | 2,000 00 | – |
| Barn deficit, | 1908 | 3,690 10 | 3,690 10 | – |
| Target range, | 1908 | 1,000 00 | 993 53 | $6 47 |
| Experiment station, | 1908 | 4,000 00 | 3,281 48 | 718 52 |
| Glass houses and instruction building, | 1908 | 34,000 00 | 18,184 97 | 15,815 03 |
| North dormitory, | 1908 | 6,000 00 | 5,999 89 | 11 |
| Library, | 1908 | 1,000 00 | 347 23 | 652 77 |
| Teaching equipment, | 1908 | 4,000 00 | 1,837 54 | 2,162 46 |
| Repairs, | 1908 | 5,000 00 | 3,879 20 | 1,120 80 |
| Totals, | . . | $192,040 10 | $171,563 94 | $20,476 16 |

## CURRENT ACCOUNTS.

### *Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1, 1907, to Nov. 30, 1908. | Receipts from Dec. 1, 1907, to Nov. 30, 1908. | Apportionment for Year ending Nov. 30, 1908. | Balance to Credit. |
|---|---|---|---|---|
| Agricultural, | $22,812 34 | $15,024 07 | $6,376 00 | —$1,412 27 |
| Botanical, | 1,156 75 | 678 60 | 500 00 | 21 85 |
| Burnham emergency income, | – | 50 00 | – | 50 00 |
| Chemical, | 2,773 60 | 795 04 | 2,272 81 | 294 25 |
| Cleaning, | 677 05 | – | – | —677 05 |
| Contingent, | 1,437 45 | 150 16 | 1,000 00 | —287 29 |
| Dean's office, | 95 34 | – | 25 00 | —70 34 |
| Entomological, | 806 90 | 180 15 | 579 86 | —46 89 |
| English, | 98 71 | – | 50 00 | —48 71 |

## CURRENT ACCOUNTS — *Concluded.*

### *Disbursements and Receipts* — Concluded.

| ACCOUNTS. | Disbursements from Dec. 1, 1907, to Nov. 30, 1908. | Receipts from Dec. 1, 1907, to Nov. 30, 1908. | Apportionment for Year ending Nov. 30, 1908. | Balance to Credit. |
|---|---|---|---|---|
| Heat, light and water, | $16,823 31 | $1,067 86 | $13,000 00 | —$2,755 45 |
| Horticultural, | 11,579 85 | 5,963 14 | 5,100 00 | —516 71 |
| Library, | 2,411 64 | 634 38 | 1,725 00 | —52 26 |
| Meteorology, | 248 05 | – | 350 00 | 101 95 |
| Miscellaneous, | 9,921 54 | 8,473 79 | – | —1,447 75 |
| Mathematics, | 194 74 | – | 255 00 | 60 26 |
| Military, | 382 89 | 25 00 | 355 00 | —2 89 |
| Normal department, | 6,061 08 | 773 09 | 3,750 00 | —1,537 99 |
| President's office, | 3,294 65 | 28 01 | 7,000 00 | 3,733 36 |
| Rents, | 85 55 | 4,658 74 | – | 4,573 19 |
| Registrar, | 97 40 | – | 75 00 | —22 40 |
| Students' fees, | – | 18 00 | – | 18 00 |
| Salaries, | 50,380 19 | 208 33 | 50,171 86 | – |
| Treasurer's office, | 611 81 | 44 07 | 600 00 | 32 26 |
| Veterinary, | 1,747 30 | 1,015 02 | 919 25 | 186 97 |
| Zoölogical, | 382 79 | 191 80 | 120 00 | —70 99 |
| Graduate school, | 68 78 | – | 250 00 | 181 22 |
| State Treasurer: — | | | | |
| Endowment fund, | – | 10,613 32 | – | – |
| Instruction fund, | – | 21,500 00 | – | – |
| Maintenance fund, | – | 11,500 00 | – | – |
| Scholarship fund, | – | 15,000 00 | – | – |
| Short courses, | – | 3,750 00 | – | – |
| Normal courses, | – | 3,750 00 | – | – |
| Deficit appropriation, | – | 13,739 17 | – | – |
| United States Treasurer: — | | | | |
| Morrill fund, | – | 16,666 67 | – | – |
| Nelson fund, | – | 6,666 66 | – | – |
| Totals, | $134,149 71[1] | $143,165 07[1] | $94,474 78 | $304 32 |
| Balance, beginning of fiscal year, Dec. 1, 1907, | – | 2,807 70 | – | – |
| Balance on hand, Nov. 30, 1908, | 11,823 06 | – | – | – |
| | $145,972 77 | $145,972 77 | – | – |

[1] These amounts are greater than the figures used in the statement by $3,061.08 for the disbursements and $1,523.09 for receipts, on account of including the normal and short course funds and leaving out the Burnham emergency account which aggregate the above.

### *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| By cash on hand, | – | $2,807 70 |
| By institution receipts, | – | 39,929 25 |
| By State Treasurer receipts, | – | 66,113 32 |
| By United States Treasurer receipts, | – | 21,388 86 |
| By accounts receivable, State Treasurer, | – | 4,500 00 |
| By total disbursements, | $134,149 71 | – |
| | $134,149 71 | $134,739 13 |
| Bills receivable Dec. 1, 1907, deducted, | – | 2,142 40 |
| Bills payable Dec. 1, 1907, deducted, | 3,066 09 | – |
| | $131,083 62 | $132,596 73 |
| Bills receivable Nov. 30, 1908, | – | 5,144 80 |
| Extraordinary expense on account of barn fire, | – | 2,347 14 |
| Bills payable Nov. 30, 1908, | 3,600 35 | – |
| Balance, | 5,404 70 | – |
| | $140,088 67 | $140,088 67 |

## EXPERIMENT STATION.

### *Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1, 1907, to Nov. 30, 1908. | Receipts from Dec. 1, 1907, to Nov. 30, 1908. | Apportionment for Year ending Nov. 30, 1908. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $1,738 14 | $88 48 | $2,150 00 | $500 34 |
| Agricultural, | 5,193 83 | 3,235 96 | 2,480 00 | 522 13 |
| Asparagus, | 1,879 33 | – | 1,100 00 | —779 33 |
| Botanical, | 1,433 88 | 54 59 | 1,400 00 | 20 71 |
| Chemical, | 7,913 34 | 4,844 57 | 3,400 00 | 331 23 |
| Cranberry, | 214 06 | – | 900 00 | 685 94 |
| Entomology, | 619 57 | 2 00 | 800 00 | 182 43 |
| Fertilizer, | – | 5,390 00 | – | 5,390 00 |
| Freight, | 438 71 | 85 | 250 00 | —187 86 |
| Feed law, | 2,813 11 | 3,003 78 | – | 190 67 |
| Graves orchard, | 189 37 | – | 500 00 | 310 63 |
| Horticultural, | 925 12 | 10 00 | 1,500 00 | 584 88 |
| Library, | 159 57 | – | 300 00 | 140 43 |
| Meteorology, | 79 63 | – | 200 00 | 120 37 |
| Publications, | 2,885 45 | – | 3,700 00 | 814 55 |
| Salaries, | 25,631 32 | 75 00 | 25,745 00 | 188 68 |
| Treasurer's office, | 340 80 | – | 400 00 | 59 20 |
| Veterinary, | 195 14 | 6 00 | 400 00 | 210 86 |
| Hatch fund, | – | 15,000 00 | – | – |
| Adams fund, | – | 10,000 00 | – | – |
| State fund, | – | 10,500 00 | – | – |
| Totals, | $52,650 37 | $52,211 23 | $45,225 00 | $9,285 86 |
| Balance, beginning of fiscal year, Dec. 1, 1907, | – | 5,719 94 | – | – |
| Balance on hand Nov. 30, 1908, | 5,280 80 | – | – | – |
|  | $57,931 17 | $57,931 17 | – | – |

## AGRICULTURAL DIVISION.

### *Disbursements and Receipts for Fiscal Year ending Nov. 30, 1908.*

|  | Disbursements. | Receipts. |
|---|---|---|
| *Academic.* |  |  |
| Maintenance, | $266 06 | $0 16 |
| Equipment, | 11 80 | – |
| Student labor, | 118 29 | – |
| Miscellaneous, | 16 21 | 46 72 |
| Winter school, | 3,167 99 | 1,866 60 |
| Totals, | $3,580 35 | $1,913 48 |
| *Farm.* |  |  |
| Labor, | $9,010 76 | $2,624 17 |
| Dairy barn, | 2,974 12 | 6,449 61 |
| Field crops, | 1,305 22 | 2,726 24 |
| Horses, | 1,396 19 | 606 09 |
| Swine, | 150 45 | 424 01 |
| Tools and implements, | 182 68 | 1 50 |
| Office, | 165 91 | 1 47 |
| Sundry, | 377 02 | 155 00 |
| Student labor, | 1,200 00 | – |
| Fire, | 2,469 64 | 122 50 |
| Totals, | $19,231 99 | $13,110 59 |
| Division totals, | 22,812 34 | 15,024 07 |

## AGRICULTURAL DIVISION — *Concluded.*

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | – | $15,024 07 |
| By bills receivable, | – | 1,513 25 |
| By fire account expenses, | – | 2,347 14 |
| By apportionment, | – | 6,376 00 |
| To total disbursements, | $22,812 44 | – |
| To bills payable, | 53 15 | – |
| To balance unexpended, | 2,394 87[1] | – |
| | $25,260 46 | $25,260 46 |

### *Inventory of Quick Assets.*

| | Dec. 1, 1907. | Nov. 30, 1908. |
|---|---|---|
| Inventory of produce, | $6,851 50 | $2,381 00 |
| Inventory of cattle, | 5,000 00 | 5,700 49 |
| Inventory of swine, | 901 00 | 206 41 |
| Inventory of horses, | 6,500 00 | 7,005 00 |
| | $19,252 50 | $15,292 90 |

---

[1] This balance includes $2,347.14 due on account of fire.

## HORTICULTURAL DIVISION.

### *Disbursements and Receipts for Fiscal Year ending Nov. 30, 1908.*

| | Disbursements. | Receipts. |
|---|---|---|
| Market gardening, | $3,668 47 | $1,748 74 |
| General horticulture, | 3,366 97 | 1,002 36 |
| Floriculture, | 2,909 44 | 1,987 53 |
| Pomology, | 1,507 93 | 1,061 21 |
| Landscape gardening, | 127 04 | 163 30 |
| Totals, | $11,579 85 | $5,963 14 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | – | $5,963 14 |
| By bills receivable, | – | 1,048 60 |
| By apportionment, | – | 5,100 00 |
| To total division disbursements, | $11,579 85 | – |
| To total division bills payable, | 114 09 | – |
| To balance unexpended, | 417 80 | – |
| | $12,111 74 | $12,111 74 |

### *Inventory of Quick Assets.*

| | Dec. 1, 1907. | Nov. 30, 1908. |
|---|---|---|
| Inventory of produce, | $295 00 | $100 00 |

## INVENTORY — REAL ESTATE.

### *Land (Estimated Value).*

| | | |
|---|---|---|
| College farm, | $37,000 00 | |
| Pelham quarry, | 500 00 | |
| Bangs place, | 2,350 00 | |
| Clark place, | 4,500 00 | |
| | | $44,350 00 |

### *College Buildings (Estimated Value).*

| | | |
|---|---|---|
| Drill hall, | $5,150 00 | |
| Powder house, | 75 00 | |
| Gun shed, | 1,500 00 | |
| Stone chapel, | 30,225 00 | |
| South dormitory, | 35,500 00 | |
| North dormitory, | 25,400 00 | |
| Chemical laboratory, | 8,200 00 | |
| Entomological laboratory, | 5,000 00 | |
| Veterinary laboratory and stable, | 23,125 00 | |
| Farmhouse, | 2,050 00 | |
| Horse barn, | 5,020 00 | |
| Barn and silo, | 21,200 00 | |
| Graves house and barn, | 1,560 00 | |
| Dining hall, | 35,450 00 | |
| Mathematical building, | 5,600 00 | |
| Wilder Hall, | 37,300 00 | |
| Tool house, | 2,000 00 | |
| Horticultural barn, | 2,525 00 | |
| Clark Hall, | 67,400 00 | |
| Durfee plant house and fixtures, | 10,000 00 | |
| Small plant house, with vegetable cellar and cold grapery, | 4,700 00 | |
| President's house, | 6,700 00 | |
| Dwelling houses purchased with farm, | 5,100 00 | |
| Power house, | 12,000 00 | |
| | | $352,780 00 |

### *College Equipment (Estimated Value).*

| | |
|---|---|
| Botanical department, | $7,349 53 |
| Horticultural department, | 16,665 46 |
| Farm, | 20,599 95 |
| Chemical laboratory, | 3,441 28 |
| Entomological laboratory, | 2,064 48 |
| Zoölogical museum, | 6,150 00 |
| Zoölogical laboratory, | 3,300 00 |
| Veterinary laboratory, | 7,181 74 |
| Physics and mathematics, | 3,377 07 |
| Dairy school, | 1,394 10 |
| Agricultural department, | 2,948 44 |
| English department, | 74 00 |
| *Amount carried forward,* | $74,546 05 |

| | | |
|---|---|---|
| *Amount brought forward,* | $74,546 05 | |
| President's office, | 1,007 93 | |
| Dean's office, | 74 00 | |
| Treasurer's office, | 800 00 | |
| Text-books, | 125 00 | |
| Library, | 51,067 55 | |
| Military department, | 679 80 | |
| Fire apparatus, | 259 60 | |
| Heating and lighting, | 45,247 74 | |
| Dining hall, | 2,078 96 | |
| Normal department, | 122 84 | |
| | | $176,009 47 |

### *Experiment Station Buildings (Estimated Value).*

| | | |
|---|---|---|
| Agricultural laboratory, | $9,000 00 | |
| Chemical laboratory (plant and animal chemistry), | 20,000 00 | |
| Entomological laboratory, | 1,700 00 | |
| | | $30,700 00 |

### *Experiment Station Equipment (Estimated Value).*

| | | |
|---|---|---|
| Director's office, | $1,911 86 | |
| Treasurer's office, | 257 50 | |
| Agricultural laboratory, | 6,522 95 | |
| Entomological laboratory, | 19,150 56 | |
| Botanical laboratory, | 3,688 88 | |
| Chemical laboratory, | 17,422 49 | |
| Horticultural laboratory, | 253 16 | |
| | | $49,207 40 |

### *Inventory Summary.*

| | | |
|---|---|---|
| Land, | $44,350 00 | |
| College buildings, | 352,780 00 | |
| College equipment, | 176,009 47 | |
| Experiment station buildings, | 30,700 00 | |
| Experiment station equipment, | 49,207 40 | |
| Total, | | $653,046 87 |

## STUDENTS' TRUST FUNDS ACCOUNTS.

| ACCOUNTS. | Disbursements for Year ending Nov. 30, 1908. | Receipts for Year ending Nov. 30, 1908. | Balance brought forward Dec. 1, 1907. | Balance on Hand Nov. 30, 1908. |
|---|---|---|---|---|
| Dining hall, | $31,441 87 | $28,981 38 | —$2,430 31 | —$4,890 80 |
| Keys, | 23 25 | 29 00 | 28 50 | 34 25 |
| Students' deposits, | 2,814 51 | 2,630 61 | 639 50 | 455 60 |
| Trophy room tax, | 304 25 | 399 00 | 80 01 | 174 76 |
| Text-books, | 2,709 04 | 2,723 15 | 864 08 | 878 19 |
| Athletic board, | 1,536 50 | 3,233 53 | – | 1,697 03 |
| | $38,829 42 | $37,996 67 | —$818 22 | —$1,650 97 |
| Balance on hand Dec. 1, 1907, | —818 22 | – | – | – |
| Balance on hand Nov. 30, 1908, | – | —1,650 97 | – | – |
| | $39,647 64 | $39,647 64 | – | – |

## DETAILED STATEMENT OF DINING HALL.

| | Liabilities. | Resources. |
|---|---|---|
| Dec. 1, 1907, inventory, | $1,428 81 | – |
| Nov. 30, 1908, provisions purchased, | 31,441 87 | – |
| Nov. 30, 1908, outstanding bills, | 1,642 28 | – |
| Nov. 30, 1908, total collections, | – | $28,981 38 |
| Nov. 30, 1908, total collections outstanding, | – | 4,488 42 |
| Nov. 30, 1908, inventory, | – | 1,489 95 |
| Balance, | 446 79 | – |
| | $34,959 75 | $34,959 75 |

## ENDOWMENT FUND.[1]

| | Principal. | Income. |
|---|---|---|
| United States grant (5 per cent.), | $219,000 00 | $7,300 00 |
| Commonwealth grant (3½ per cent.), | 142,000 00 | 3,313 32 |
| | | $10,613 32 |

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[1] This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

## BENEFICIARY FUNDS.

### *Burnham Emergency Fund.*

| | Principal. | Income |
|---|---|---|
| Two Lake Shore & Michigan Southern Railroad gold notes, par value, | $2,000 00 | $100 00 |
| Two bonds American Telegraph and Telephone Company 4's, par value, | 2,000 00 | – |
| One bond United Fruit, par value, | 1,000 00 | – |
| | $5,000 00 | $100 00 |
| These bonds, American Telegraph and Telephone and United Fruit, cost $2,747.38, leaving for further investment, | . . . | 252 62 |
| | | $352 62 |
| Disbursements for prizes, | . . . | 110 00 |
| Cash on hand Dec. 1, 1908, | . . . | $242 62 |

### *Library Fund.*

| | | |
|---|---|---|
| Five bonds Lake Shore & Michigan Southern Railroad 4's, par value, | $5,000 00 | $200 00 |
| Five bonds New York Central & Hudson River Railroad 4's, par value, | 5,000 00 | 200 00 |
| Two shares New York Central & Hudson River Railroad stock, par value, | 200 00 | 10 50 |
| Amherst Savings Bank, | 167 77 | 6 68 |
| | $10,367 77 | $417 18 |
| Transferred to library account, | . . . | 417 18 |

## SPECIAL FUNDS.

### *Endowed Labor Fund (the Gift of a Friend of the College).*

| | Principal. | Income. |
|---|---|---|
| Two bonds American Telegraph and Telephone Company 4's, par value, | $2,000 00 | $80 00 |
| One bond New York Central Railroad debenture 4's, par value, | 1,000 00 | 40 00 |
| Two bonds Lake Shore & Michigan Southern Railroad 4's, par value, | 2,000 00 | 80 00 |
| Amherst Savings Bank, | 143 39 | 5 72 |
| | $5,143 39 | $205 72 |
| Unexpended balance Dec. 1, 1907, | . . . | 269 23 |
| Cash on hand Dec. 1, 1908, | . . . | $474 95 |

### *Whiting Street Scholarship Fund.*

| | Principal. | Income. |
|---|---|---|
| One bond New York Central Railroad debenture 4's, par value, | $1,000 00 | $40 00 |
| Amherst Savings Bank, | 271 64 | 10 84 |
| Unexpended balance Dec. 1, 1907, | – | 58 61 |
| | $1,271 64 | $109 45 |
| Disbursements for scholarships, | . . . | 71 00 |
| Cash on hand Dec. 1, 1908, | . . . | $38 45 |

### *Hills Fund.*

| | | Principal. | Income. |
|---|---|---|---|
| Northampton Institution for Savings, | | $1,180 00 | $91 01 |
| One bond American Telegraph and Telephone Company 4's, par value, | | 1,000 00 | 40 00 |
| Three American Telephone Co's. notes, par value, | | 3,000 00 | 150 00 |
| One bond New York Central & Lake Shore R.R. 3½'s, par value, | | 1,000 00 | 35 00 |
| One bond New York Central & Hudson River Railroad debentures 4's, par value, | | 1,000 00 | 40 00 |
| One bond New York Central & Hudson River Railroad gold note, 5 per cent, par value, | | 1,000 00 | 50 00 |
| One bond Metropolitan Street Railway, Kansas City, 5 per cent., par value, | | 1,000 00 | 25 00 |
| Boston & Albany Railroad stocks, par value, | | 362 00 | 31 68 |
| Amherst Savings Bank, | | 72 75 | 2 88 |
| Unexpended balance Dec. 1, 1907, | | – | 1,187 71 |
| | | $9,614 75 | $1,653 28 |
| Disbursements by horticultural and botanical departments, | $385 71 | | |
| Disbursements by purchase of one $1,000 bond of the Metropolitan Street Railway Company, 5 per cent., | 991 67 | . . . | 1,377 38 |
| Cash on hand Dec. 1, 1908, | | . . . | $275 90 |

### *Mary Robinson Fund.*

| | Principal. | Income. |
|---|---|---|
| Northampton Institution for Savings, | $820 00 | $63 24 |
| Boston & Albany Railroad stock, par value, | 38 00 | 3 32 |
| Unexpended balance Dec. 1, 1907, | – | 32 75 |
| | $858 00 | $99 31 |
| Disbursements for scholarships, | . . . | 72 00 |
| Cash on hand Dec. 1, 1908, | . . . | 27 31 |

## SPECIAL FUNDS — *Concluded.*

### *Grinnell Prize Fund.*

| | Principal. | Income. |
|---|---|---|
| Ten shares New York Central & Hudson River Railroad stock, par value, | $1,000 00 | $52 50 |
| Unexpended balance Dec. 1, 1907, | – | 128 74 |
| | $1,000 00 | $181 24 |
| Disbursements for prizes, | . . . | 60 00 |
| Cash on hand Dec. 1, 1908, | . . . | $121 24 |

### *Gassett Scholarship Fund.*

| | | |
|---|---|---|
| One bond New York Central debentures 4's, par value, | $1,000 00 | $40 00 |
| Amherst Savings Bank, | 11 64 | 44 |
| Unexpended balance Dec. 1, 1907, | – | 40 55 |
| | $1,011 64 | 80 99 |
| Disbursements for scholarships, | . . . | 23 50 |
| Cash on hand Dec. 1, 1908, | . . . | 57 49 |

### *Massachusetts Agricultural College (Investment).*

| | | |
|---|---|---|
| One share New York Central & Hudson River Railroad stock, par value, | $100 00 | $5 25 |
| Unexpended balance Dec. 1, 1907, | . . . | 27 75 |
| Cash on hand Dec. 1, 1908, | . . . | $33 00 |

### *Summary of Balances on Hand of the Income from Funds held in Trust by Massachusetts Agricultural College.*

| | | |
|---|---|---|
| Burnham emergency, | $242 62 | |
| Endowed labor fund, | 474 95 | |
| Whiting Street scholarship, | 38 45 | |
| Hills fund, | 275 90 | |
| Mary Robinson fund, | 27 31 | |
| Gassett scholarship, | 57 49 | |
| Grinnell prize, | 121 24 | |
| Massachusetts Agricultural College investment, | 33 00 | |
| Cash on hand Dec. 1, 1908, | | $1,270 96 |

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the treasurer, Fred C. Kenney, for the year ending Nov. 30, 1908. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHARLES A. GLEASON,
*Auditor.*

AMHERST, Dec. 30, 1908.

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# CATALOGUE

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE,

## 1908-1909.

## FORTY-SIXTH ANNUAL REPORT.

## PART II.

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# MASSACHUSETTS AGRICULTURAL COLLEGE,

**AMHERST.**

Report

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1908–09

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## 1908

### July

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | . . |
| . . | . . | . . | . . | . . | . . | . . |

### August

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | . . | . . | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | . . | . . | . . | . . | . . |

### September

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### October

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| . . | . . | . . | . . | . . | . . | . . |

### November

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | . . | . . | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### December

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

## 1909

### January

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | . . | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | . . | . . | . . | . . | . . | . . |

### February

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | . . | . . | . . | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### March

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### April

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | . . |
| . . | . . | . . | . . | . . | . . | . . |

### May

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | . . | . . | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | . . | . . | . . | . . | . . |

### June

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### July

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| . . | . . | . . | . . | . . | . . | . . |

### August

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | . . | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### September

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### October

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | . . | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | . . | . . | . . | . . | . . | . . |

### November

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | . . | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### December

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | . . |
| . . | . . | . . | . . | . . | . . | . . |

## 1910

### January

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | . . | . . | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | . . | . . | . . | . . | . . |

### February

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | . . | . . | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### March

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### April

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | . . | . . | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| . . | . . | . . | . . | . . | . . | . . |

### May

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | . . | . . | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

### June

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| . . | . . | . . | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | . . | . . |
| . . | . . | . . | . . | . . | . . | . . |

# THE MASSACHUSETTS AGRICULTURAL COLLEGE.

# CALENDAR.

**1909.**

| | |
|---|---|
| January 4, Monday, 1 P.M., | Winter recess ends. |
| February 1, Monday, | Semester examinations begin. |
| February 8, Monday, 1 P.M., | Second semester begins. |
| February 22, Monday, | Washington's birthday, holiday. |
| March 26, Friday, 6 P.M., | Spring recess begins. |
| April 5, Monday, 1 P.M., | Spring recess ends. |
| April 19, Monday, | Patriots' Day, holiday. |
| May [31, Monday], | Memorial Day, holiday. |
| June 7, Monday, | Senior examinations begin. |
| June 15, Tuesday, | Non-senior examinations begin. |
| June 19–23, Saturday–Wednesday, | Commencement exercises. |
| June 24–25, Thursday–Friday, | Entrance examinations. |

SUMMER VACATION.

| | |
|---|---|
| September 13–14, Monday–Tuesday, | Entrance examinations. |
| September 13–15, Monday–Wednesday, | Condition examinations. |
| September 15, Wednesday, 9.30 A.M., | First semester begins; assembly. |
| November 24–29, Wednesday, 1 P.M.–Monday, 1 P.M., | Thanksgiving recess. |
| December 17, Friday, 6 P.M., | Winter recess begins. |

**1910.**

| | |
|---|---|
| January 3, Monday, 1 P.M., | Winter recess ends; assembly. |
| January 31, Monday, | Semester examinations begin. |
| February 7, Monday, 1 P.M., | Second semester begins; assembly. |
| February 22, Tuesday, | Washington's Birthday, holiday. |
| March 25, Friday, 6 P.M., | Spring recess begins. |
| April 4, Monday, 1 P.M., | Spring recess ends; assembly. |
| April 19, Tuesday, | Patriots' Day, holiday. |
| May 30, Monday, | Memorial Day, holiday. |
| June 6, Monday, | Senior examinations begin. |
| June 14, Tuesday, | Non-senior examinations begin. |
| June 18–22, Saturday–Wednesday, | Commencement exercises. |
| June 23–24, Thursday–Friday, | Entrance examinations. |

# MASSACHUSETTS AGRICULTURAL COLLEGE.

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HISTORY. — The Massachusetts Agricultural College was among the colleges established under the national land grant act of 1862. This act gave public lands to the several States and Territories for the establishment of colleges for the benefit of agriculture and the mechanic arts; it was framed by the late Senator Justin Smith Morrill of Vermont. For our own college, liberal appropriations are also made by the Legislature of Massachusetts.

The college was incorporated in 1864, and on the 2d of October, 1867, was formally opened to an entering class of 33. In January, 1875, an arrangement was made with the authorities of Boston University under which the college, without losing its independence, became the school of agriculture of the university. Under this arrangement, graduates of the Massachusetts Agricultural College may, upon certain conditions, receive the diploma in science awarded to graduates of the university. In 1882 the State experiment station was located at the college. It has since been incorporated with the college.

COURSES. — The college offers a free education to any American student who may fulfill the requirements of admission. Women are admitted on the same standing as men. Foreign students pay a tuition fee. The four-years course leads to the degree of bachelor of science, and graduate courses are given leading to the degrees of master of science and of doctor of philosophy. Winter courses of ten weeks are offered, and, upon announcement, special courses. There is also a summer school of agriculture, designed chiefly for persons desiring to teach agriculture in the elementary and high schools.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement, the term "agricultural" is used in the broadest sense. Courses are offered which give efficiency in various practical pursuits, such as general farming, dairying, the management of estates, fruit growing, glass farming, landscape gardening, forestry and arboriculture. Students also qualify for positions in institutions designed for investigation in the many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for business occupations having connection with the farm and needing expert service.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences — particularly chemistry, physics, mathematics and engineering — are an essential preparation. Still other students find the course a splendid general education, without regard to future occupation. The course is well balanced; each student is required to study English, a modern foreign language, literature, political science and history.

Location and Equipment. — Situated in the beautiful town of Amherst, the college has an inspiring outlook. The campus is especially attractive. The grounds comprise more than 400 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst, 97 miles west of Boston, is on the Central Vermont Railroad and the Central Massachusetts division of the Boston & Maine Railroad. Electric car lines connect the village with Northampton, Holyoke, Springfield and other cities. The town library is open to students, in addition to the college library, as are also good courses of lectures and concerts in the village, supplementing the various interests of college life.

# THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

# THE CORPORATION.

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## MEMBERS OF THE CORPORATION.

| | TERM EXPIRES |
|---|---|
| FRANK GERRETT of Greenfield, | 1910 |
| SAMUEL C. DAMON of Lancaster, | 1910 |
| THOMAS L. CREELEY of Belmont, | 1911 |
| CHARLES H. PRESTON of Danvers, | 1911 |
| CARROLL D. WRIGHT[1] of Worcester, | 1912 |
| M. FAYETTE DICKINSON of Boston, | 1912 |
| WILLIAM H. BOWKER of Boston, | 1913 |
| GEORGE H. ELLIS of Boston, | 1913 |
| J. HOWE DEMOND of Northampton, | 1914 |
| ELMER D. HOWE of Marlborough, | 1914 |
| NATHANIEL I. BOWDITCH of Framingham, | 1915 |
| WILLIAM WHEELER of Concord, | 1915 |
| ARTHUR G. POLLARD of Lowell, | 1916 |
| CHARLES A. GLEASON of New Braintree, | 1916 |

## MEMBERS EX OFFICIO.

His Excellency Governor EBEN S. DRAPER,
*President of the Corporation.*

KENYON L. BUTTERFIELD, *President of the College.*

GEORGE H. MARTIN, *Secretary of the Board of Education.*

J. LEWIS ELLSWORTH, *Secretary of the Board of Agriculture.*

## OFFICERS OF THE CORPORATION.

His Excellency Governor EBEN S. DRAPER of Boston,
*President.*

CHARLES A. GLEASON of New Braintree, *Vice-President.*

J. LEWIS ELLSWORTH of Worcester, *Secretary.*

FRED C. KENNEY of Amherst, *Treasurer.*

CHARLES A. GLEASON of New Braintree, *Auditor.*

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[1] Died Feb. 20, 1909; succeeded by Davis R. Dewey of Cambridge.

## STANDING COMMITTEES OF THE CORPORATION.[1]

### *Committee on Finance.*

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
ARTHUR G. POLLARD.
J. HOWE DEMOND.
CHARLES H. PRESTON.

### *Committee on Course of Study and Faculty.*

WILLIAM WHEELER, *Chairman.*
WILLIAM H. BOWKER.
M. FAYETTE DICKINSON.
GEORGE H. MARTIN.
ELMER D. HOWE.
CARROLL D. WRIGHT.[2]

### *Committee on Farm and Horticulture.*

#### *Farm Division.*

GEORGE H. ELLIS, *Chairman.*
FRANK GERRETT.
CHARLES A. GLEASON.
NATHANIEL I. BOWDITCH.

#### *Horticulture Division.*

J. LEWIS ELLSWORTH, *Chairman.*
THOMAS L. CREELEY.
ELMER D. HOWE.

### *Committee on Experiment Department.*

CHARLES H. PRESTON, *Chairman.*
J. LEWIS ELLSWORTH.
WILLIAM H. BOWKER.
ARTHUR G. POLLARD.
SAMUEL C. DAMON.

### *Committee on Buildings and Arrangement of Grounds.*

M. FAYETTE DICKINSON, *Chairman.*
WILLIAM WHEELER.
FRANK GERRETT.
WILLIAM H. BOWKER.
NATHANIEL I. BOWDITCH.

## EXAMINING COMMITTEE OF OVERSEERS.

JOHN BURSLEY of West Barnstable, *Chairman.*
WARREN C. JEWETT of Worcester.
ISAAC DAMON of Wayland.
FRANK GERRETT of Greenfield.
NOBLE B. TURNER of Great Barrington.

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[1] The president of the college is ex-officio member and secretary of standing committees. The director of the experiment station is a member of the committee on experiment department, without vote.

[2] Died Feb. 20, 1909; succeeded by Davis R. Dewey of Cambridge.

# OFFICERS OF THE INSTITUTION.

## THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

KENYON L. BUTTERFIELD, A.M., President of the College and Professor of Rural Sociology, 25 Sunset Avenue.

GEORGE F. MILLS, M.A., Dean of the College, Head of the Division of the Humanities and Professor of Languages and Literature, 46 Amity Street.

CHARLES H. FERNALD, Ph.D., Director of the Graduate School and Professor of Zoölogy, 3 Hallock Street.

WILLIAM P. BROOKS, Ph.D., Director of the Experiment Station and Lecturer on Soil Fertility, Massachusetts Agricultural College.

FRANK A. WAUGH, M.Sc., Head of the Division of Horticulture and Professor of Landscape Gardening, Massachusetts Agricultural College.

JAMES A. FOORD, M.Sc., Acting Head of the Division of Agriculture and Professor of Farm Administration, Nutting Avenue.

CHARLES A. GOESSMANN, Ph.D., LL.D., Honorary Professor of Chemistry and Honorary Director of the Experiment Station, 40 Pleasant Street.

CHARLES WELLINGTON, Ph.D., Professor of General and Agricultural Chemistry, 34 Amity Street.

JAMES B. PAIGE, B.Sc., D.V.S., Professor of Veterinary Science, 42 Lincoln Avenue.

GEORGE E. STONE, Ph.D., Professor of Botany, Mt. Pleasant.

JOHN E. OSTRANDER, A.M., C.E., Professor of Mathematics and Civil Engineering, 33 North Prospect Street.

HENRY T. FERNALD, Ph.D., Professor of Entomology, 44 Amity Street.

GEORGE C. MARTIN, C.E., Captain 18th United States Infantry, Professor of Military Science and Tactics, Amherst House.

WILLIAM R. HART, A.M., Professor of Agricultural Education, 97 Pleasant Street.

FRED C. SEARS, M.Sc., Professor of Pomology, Mt. Pleasant.

PHILIP B. HASBROUCK, B.Sc., Associate Professor of Mathematics, Adjunct Professor of Physics and Registrar of the College, 130 Pleasant Street.

FRED C. KENNEY, Treasurer, Mt. Pleasant.

S. FRANCIS HOWARD, M.Sc., Assistant Professor of Chemistry, 10 Allen Street.

A. VINCENT OSMUN, M.Sc., Assistant Professor of Botany, North Amherst.

GEORGE N. HOLCOMB, A.B., S.T.B., Assistant Professor of Political Science, North Amherst.

Clarence E. Gordon, B.Sc., A.M., Assistant Professor of Zoölogy and Curator of the Zoölogical Museum, North Amherst.

Robert Wilson Neal, A.M., A.M., A.M., Assistant Professor of English, 7 Woodside Avenue.

Edward A. White, B.Sc., Assistant Professor of Floriculture, 55 Pleasant Street.

Percy L. Reynolds, M.D., Assistant Professor of Physical Education and Hygiene, North Amherst.

William P. B. Lockwood, B.S.Agr., Assistant Professor of Dairying, 5 East Pleasant Street.

Robert W. Lyman, B.Sc., LL.B., Lecturer on Farm Law, Northampton.

Frank W. Rane, M.Sc., Lecturer on Forestry, State House, Boston.

Robert D. MacLaurin, Ph.D., Lecturer on Organic Chemistry, 6 Kellogg Avenue.

Sidney B. Haskell, B.Sc., Instructor in Agronomy, 12 Cottage Street.

Harold F. Tompson, B.Sc., Instructor in Market Gardening, Massachusetts Agricultural College.

Ray L. Gribben, B.S.A., Instructor in Animal Husbandry, 66 Pleasant Street.

Floyd B. Jenks, B.S.Agr., Instructor in Agricultural Education, 97 Pleasant Street.

Edgar L. Ashley, A.M., Instructor in German, 12 Lincoln Avenue.

Anderson A. Mackimmie, A.B., Instructor in French and Spanish, North Amherst.

C. Robert Duncan, B.Sc., Instructor in Mathematics and Physics, 46 Pleasant Street.

Charles R. Green, B.Agr., Librarian, Mt. Pleasant.

Alexander E. Cance, Ph.D., Instructor in Agricultural Economics, 9 Fearing Street.

Frank M. Gracey, Assistant in Landscape Gardening, 56 Pleasant Street.

Ernest C. Fowler, B.S., Assistant in Chemistry, 15 Amity Street.

Harry M. Jennison, B.Sc., Assistant in Botany, 66 Pleasant Street.

Leon I. Shaw, M.Sc., Assistant in Chemistry, 66 Pleasant Street.

## Other College Officers.

Edwin H. Forristall, M.Sc., Farm Superintendent, Massachusetts Agricultural College.

Ralph J. Watts, B.Sc., Secretary to the President, 116 Pleasant Street.

Newton Wallace, Electrician, 6 Phillips Street.

Clarence A. Jewett, Superintendent of Buildings, 16 Whitney Street.

Miss Clara L. Stuart, Correspondence Clerk, Draper Hall.

Miss Mary E. Caldwell, Bookkeeper, Treasurer's Office, Draper Hall.

Miss Henrietta Webster, Clerk, Treasurer's Office, 79 Pleasant Street.

Miss Edith C. Hubley, Stenographer, Division of Horticulture, Draper Hall.

Miss Gertrude Warner, Stenographer, Division of Agriculture, Draper Hall.

## Additional Instructors for the Summer School, 1908.

Dr. W. D. Hurd, Professor in the University of Maine: Field Crops and Agricultural Industry.

Dr. T. N. Carver, Professor in Harvard University: Agricultural Economics.

A. C. Monahan, Principal of the Turners Falls High School: High School Chemistry.

Prof. W. H. Dudley, of the Wisconsin Normal School: Bird Life.

## Additional Instructors for the Winter Course, 1909.

Nathan J. Hunting, B.Sc., Instructor in the Use of Separators.

Samuel Coons, Instructor in Butter Making.

John N. Summers, B.Sc., Instructor in Entomology.

Newton Wallace, Instructor in Dairy Mechanics.

## Graduate Assistants.

John N. Summers, B.Sc., Assistant in Entomology.

# OFFICERS OF THE EXPERIMENT STATION.

Charles A. Goessmann, Ph.D., LL.D., Honorary Director and Expert Consulting Chemist, 40 Pleasant Street.

William P. Brooks, Ph.D., Director, Massachusetts Agricultural College.

Fred C. Kenney, Treasurer, Mt. Pleasant.

Charles R. Green, B.Agr., Librarian, Mt. Pleasant.

## Department of Plant and Animal Chemistry.

Joseph B. Lindsey, Ph.D., Chemist, 47 Lincoln Avenue.

Edward B. Holland, M.Sc., Associate Chemist, in Charge of Research Division, 28 North Prospect Street.

Henri D. Haskins, B.Sc., In Charge of Fertilizer Division, 87 Pleasant Street.

Robert D. MacLaurin, Ph.D., First Assistant in Research Division, 6 Kellogg Street.

Philip H. Smith, B.Sc., In Charge of Feed and Dairy Division, 102 Main Street.

Roy F. Gaskill, Assistant in Animal Nutrition, Massachusetts Agricultural College.

Lewell S. Walker, B.Sc., Assistant, 19 Phillips Street.

Philip V. Goldsmith, B.Sc., Assistant, 32 North Prospect Street.

James C. Reed, B.Sc., Assistant, 19 Phillips Street.

James P. Howard, Inspector.

## Department of Agriculture.

William P. Brooks, Ph.D., Agriculturist, Massachusetts Agricultural College.

Erwin S. Fulton, B.Sc., First Assistant Agriculturist, North Amherst.

Edwin F. Gaskill, B.Sc., Second Assistant Agriculturist, Mr. Goldberg's.

## Department of Horticulture.

Frank A. Waugh, M.Sc., Horticulturist, Massachusetts Agricultural College.

Fred C. Sears, M.Sc., Pomologist, Mt. Pleasant.

Jacob K. Shaw, M.Sc., Assistant Horticulturist, Amherst House Annex.

## Department of Botany and Vegetable Pathology.

George E. Stone, Ph.D., Botanist and Vegetable Pathologist, Mt. Pleasant.

George H. Chapman, B.Sc., Assistant Botanist, Fearing Street.

## DEPARTMENT OF ENTOMOLOGY.

CHARLES H. FERNALD, Ph.D., Entomologist, 3 Hallock Street.
HENRY T. FERNALD, Ph.D., Associate Entomologist, 44 Amity Street.
JOHN N. SUMMERS, B.Sc., Assistant Entomologist, 66 Pleasant Street.

## DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., Veterinarian, 42 Lincoln Avenue.

## DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., Meteorologist, 33 North Prospect Street.
ROCKWOOD C. LINDBLAD, Observer, Massachusetts Agricultural College.

## OTHER OFFICERS OF THE EXPERIMENT STATION.

Miss ROSE J. BROWN, Secretary to the Director, Draper Hall.
Miss JESSIE V. CROCKER, Stenographer, Department of Botany and Vegetable Pathology, Sunderland.
Miss HARRIET COBB, Stenographer, Department of Plant and Animal Chemistry, 33 Cottage Street.
Miss BRIDIE O'DONNELL, Stenographer, Department of Entomology, Amherst.

# COMMITTEES OF THE FACULTY.

## INSTRUCTION.[1]

Professor MILLS, *Chairman.*
Professor WELLINGTON.
Professor OSTRANDER.
Professor WAUGH.
Professor HART.
Professor FOORD.

## ENTRANCE EXAMINATIONS AND ADMISSION.[1]

The REGISTRAR, *Chairman.*
Assistant Professor HOWARD.
Assistant Professor GORDON.
Assistant Professor NEAL.
Assistant Professor HOLCOMB.

## GRADUATE SCHOOL.[1]

Professor C. H. FERNALD, *Chairman.*
Professor WELLINGTON.
Professor STONE.
Professor H. T. FERNALD.
Professor WAUGH.
Professor MILLS.

## STUDENT ACTIVITIES.[1]

The DEAN, *Chairman.*
Professor STONE.
Captain MARTIN.
Professor SEARS.
Mr. GRIBBEN.

## ATHLETICS.[1]

Professor PAIGE, *Chairman.*
Assistant Professor REYNOLDS.
Assistant Professor GORDON.

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[1] The president is ex officio a member.

## CATALOGUE AND OTHER PUBLICATIONS.[1]

Assistant Professor NEAL, *Chairman.*
Assistant Professor OSMUN.
Professor OSTRANDER.

## LIBRARY.[1]

Professor Stone, CHAIRMAN.
Professor BROOKS.
Professor H. T. FERNALD.
The TREASURER.

## SCHEDULE.[1]

Professor OSTRANDER, *Chairman.*
Professor PAIGE.

## ADVISORY COMMITTEE ON STUDENT LABOR.

The TREASURER, *Chairman.*
The DEAN.
The REGISTRAR.

## ADVISORY COMMITTEE ON DISCIPLINE.

The DEAN, *Chairman.*
The REGISTRAR.
The TREASURER.
The COMMANDANT.

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[1] The president is ex officio a member.

# THE COLLEGE.

# ADMISSION.

## A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. If an applicant desires a free State scholarship, he must also present to the registrar a certificate of appointment from the State senator of his district. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

## B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be satisfied by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.

2. By presenting certificate from any school approved by the college entrance examination boards.

3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present at least three of the six required subjects for admission, and not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. A candidate deficient in both algebra and plane geometry will not be admitted. For the fall of 1909 conditions to the amount of three and one-half units will be allowed; for the fall of 1910 conditions to the amount of two and one-half units; for the fall of 1911 and the following years conditions to the amount of two units will be allowed.

*Places of Examination.* — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall; in Pittsfield, in the City Hall.

In September of each year: in Amherst only, in the building of the Department of Mathematics, Massachusetts Agricultural College.

*Time Schedule for Examinations, 1909.* — The examinations for entrance in 1909 will be held on the following dates: —

In June, on Thursday, June 24, and Friday, June 25.

In September, on Monday, September 13, and Tuesday, September 14.

The schedule for examination in both June and September will be as follows: —

*First Day.*

| | |
|---|---|
| 8.30 A.M. | Registration. |
| 9.00 A.M. | Chemistry, solid geometry. |
| 11.00 A.M. | United States history and civics. |
| 2.00 P.M. | Plane geometry. |
| 4.00 P.M. | History, elective. |

*Second Day.*

| | |
|---|---|
| 8.30 A.M. | Algebra. |
| 10.30 A.M. | Physiology, chemistry. |
| 2.00 P.M. | English. |
| 4.30 P.M. | French or German. |

## C. REQUIREMENTS FOR ADMISSION.

**In June and September, 1909, candidates for admission upon certificate may offer themselves under the requirements announced in the catalogue of 1907-08 (see Addenda, "Examinations in 1909"), or under those here stated; but candidates for admission upon examination will not be examined except according to the announcements of the earlier catalogue.**

The following requirements will therefore be in force in 1909 for certification only, but thereafter for both certification and examination.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of five recitations a week for a school year. Fourteen units must be offered for admission, of which nine are required and five are elective.

(*a*) The following nine units are required: —

*Language.*

| | |
|---|---|
| English, | 3 |
| French or German, | 2 |

*History and Civics.*

| | |
|---|---|
| United States history and civics, | ½ |
| History (elective), | 1 |
| (*a*) Ancient history. | |
| (*b*) Medieval and modern history. | |
| (*c*) English history. | |
| (*d*) General history. | |

*Mathematics.*

| | |
|---|---|
| Algebra, through progressions, | 1½ |
| Plane geometry, | 1 |

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

*Language.*

| | |
|---|---|
| English in addition to requirements, | 1 |
| French in addition to requirements, | 2 or 1[1] |
| German in addition to requirements, | 2 or 1[1] |
| Greek, | 2 or 3 |
| Latin, | 2 or 3 |

*History.*

| | |
|---|---|
| In addition to requirements, | 1 or 2 |

*Mathematics, and Other Sciences.*

| | |
|---|---|
| Solid geometry, | ½ |
| Trigonometry, | ½ |
| Chemistry, | 1 |
| Physiography, | ½ |
| Physiology, | ½ |

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[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

| | |
|---|---|
| Agriculture,[1] | ½ or 1 |
| Botany,[1] | ½ or 1 |
| Geology,[1] | ½ |
| Physics,[1] | 1 |
| Zoölogy,[1] | ½ |
| Commercial geography,[2] | ½ |
| Drawing,[2] | ½ |
| Manual training,[2] | ½ or 1 |

**PRESENTATION OF NOTE-BOOKS.** — In specified subjects, the keeping of note-books is required as part of the preparation. If an applicant present a certificate in any one of these subjects, the certificate must state that the note-book has been satisfactorily prepared, but the note-book itself is not to be submitted; but if the applicant takes an examination, he must submit the note-book itself, at the same time as and as part of the examination; and note-books so presented must themselves be certified by the principal.

## D. STATEMENT[3] OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board (address sub-station 84, New York City), or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half unit or the one unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

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[1] Note-books required as part of preparation in these subjects; must be presented, properly certified, at examination; must be certified to but not presented in case of admission on certificate.

[2] Certification necessary in these subjects; no examinations given.

[3] In alphabetical order by subjects.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

COMMERCIAL GEOGRAPHY. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

DRAWING. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see Manual Training.

ENGLISH. — In English, preparation for entrance to the college will best be made according to the recommendations of the Conference on Uniform Entrance Requirements in English, as embodied in the requirements stated by the College Entrance Examination Board (address sub-station 84, New York City).[1] Ability to think clearly, and to spell, punctuate and paragraph creditably, is indispensable. For the rhetorical study, a simple text is sufficient; but much practice in composition should be given.[2] Direct questions may be put, and tests in grammar will be included. Preparation should extend to both lists of books; and, in addition to this preparation, each candidate should be able to paraphrase or interpret with some insight unfamiliar verse or prose of medium difficulty; such a test of his ability to understand language independently will be included in the examination.

The following list of books, made up from the list recommended by the Conference on Uniform Entrance Requirements in English, enumerates the works recommended by the Conference of New England Colleges. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of February preceding the examinations.

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[1] As a member of the Conference of New England Colleges on Entrance Examinations in English, this college will adapt itself to the policy of that conference.

[2] Upon request, the Department of English will send a leaflet containing fuller explanations and suggestions, recommendations about the fourth (elective) credit, and a definition of the term "credit unit" as it concerns English.

(*a*) For reading and composition practice — Shakspere's "Merchant of Venice" and "Julius Cæsar;" the "Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography;" Scott's "Ivanhoe;" Hawthorne's "House of the Seven Gables;" Dickens's "A Tale of Two Cities;" Scott's "The Lady of the Lake;" Macaulay's "Lays of Ancient Rome;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur."

(*b*) For detailed study and practice — Shakspere's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

FRENCH. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board (sub-station 84, New York City).[1]

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

GEOLOGY. — Grouped with zoölogy, which see.

GERMAN. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-years requirements).[1]

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

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[1] A leaflet giving fuller information may be had by applying to the Department of Modern European Languages.

GREEK. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first two books of Xenophon's "Anabasis;" and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency is shown in (*a*) the translation of a passage or passages selected from the first book of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the forms and constructions of the passages.

HISTORY. — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board (sub-station 84, New York City). The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

LATIN. — Latin will receive credit as an elective requirement by either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," books I. to IV., or an equivalent, and from Cicero's "Orations against Catiline;" and (*b*). the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency is shown in (*a*) the translation of a passage or passages selected from books I. and II. of Virgil's "Æneid;" and (*b*) translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents; the formulas for the $n$th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOGRAPHY and PHYSIOLOGY. — Grouped with Zoölogy, which see.

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY, PHYSIOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography," Gilbert & Brigham's "Introduction to Physical Geography." For physiology, Hough & Sedgwick's "The Human Mechanism," Martin's "The Human Body; Briefer Course." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy."

Applicants for examination in zoölogy and geology are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, and some option will be given the student among questions, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

## E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

### F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. Candidates must in 1909 receive credit for at least ten and one-half units; in 1910, for eleven and one-half units; and thereafter for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.

4. Opportunities for removing entrance conditions are given six weeks after the opening of the college year. If a student fail at that time to clear his record of conditions, he may be given a second opportunity two weeks before the close of the first semester of the freshman year.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Preliminary examinations in part of the subjects required for entrance may be taken one year before entering college.

7. Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

(*a*) No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

(*b*) No applicant under twenty-one years of age will be admitted as an unclassified student.

(*c*) Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

(*d*) In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

(*e*) Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

(*f*) All unclassified students are subject to the supervision of a special committee.

(*g*) Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

(*h*) Unclassified students are subject to the regulations applying to classified students.

8. For information concerning expenses, scholarships, etc., see "General Information."

9. For information concerning admission to short courses see "Short Courses."

# COURSES OF INSTRUCTION.

## A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

### FRESHMAN YEAR.

### *First Semester.*

[All work required.]

| | |
|---|---|
| English and public speaking,<br>(With declamation, 5; without it, 4.) | 5 or 4 |
| French or German,[1] | 4 |
| Algebra, | 5 |
| Chemistry, | 3 |
| Hygiene, | 1 |
| Physical education,[2] | 2 |
| College life (attendance required without credit). | |
| | 20 or 19 |

### *Second Semester.*

[All work required.]

| | |
|---|---|
| English and public speaking,<br>(With declamation, 5; without it, 4.) | 5 or 4 |
| French or German, | 4 |
| Geometry and trigonometry, | 5 |
| Chemistry, | 3 |
| Elementary agriculture, | 2 |
| Physical education, | 2 |
| | 21 or 20 |

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[1] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

[2] Physical education includes military training.

## SOPHOMORE YEAR.

### *First Semester.*

[All work required.]

| | |
|---|---|
| English (proficient students may omit one hour), | 2 or 1 |
| French or German, | 3 |
| Agronomy, | 3 |
| Zoölogy, | 3 |
| Physics, | 5 |
| Physical education, | 2 |
| | 18 or 17 |

### *Second Semester.*

[All courses under "Required," with any two of those under "Elective."]

[Required.]

| | |
|---|---|
| English (proficient students may omit one hour), | 2 or 1 |
| Elementary horticulture, | 2 |
| Botany, | 4 |
| Agricultural industry, | 3 |
| Physical education, | 2 |
| | 13 or 12 |

[Elective.]

| | | |
|---|---|---|
| French or German,<br>Animal husbandry,<br>Geology,<br>Physics,<br>Chemistry,<br>Surveying, | each 3 hours. Any two, | 6 |
| | | 19 or 18 |

## JUNIOR AND SENIOR YEARS.

In the junior and in the senior year, work must be taken amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

| | |
|---|---|
| Physical education, two credits each semester of junior year, | 4 |
| Political science (Course 1, Economics), | 3 |
| English (any of the elective courses except Literature 15 and 16), | 3 |

[Elective.]

Unless otherwise stated, elective courses are open to both juniors and seniors. Elections are subject to such provisions as the faculty may declare.

[Only those courses are here mentioned which are entirely elective; some courses that are open to election by part of the students but are required courses for others are omitted. For such courses, see under the respective department headings the descriptions of "Required Courses."]

Agricultural education, 1, 2, 3, 5, 6.
Agriculture: —
  Agriculture, 2.
  Agronomy, 1, 3, 4, 5, 6.
  Animal husbandry, 2, 3, 4, 5, 6.
  Dairying, 1, 2, 3, 4.
  Farm administration, 3, 4.
Botany, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14.
Chemistry, 4, 5, 6, 7, 9, 10, 11, 12, 14, 16.
Entomology, 2, 3, 4.
Horticulture: —
  Horticulture, 3, 4, 5, A.
  Pomology, 1, 2, 3, 4.
  Floriculture, 1, 2, 3, 4.
  Landscape gardening, 1, 2, 3, 4, 5, 6.
  Market gardening, 2, 3.
  Drawing, 1, 2.
Humanities: —
  English language, 7, 9, 10, 11, 13, 14, (15, 16).
  Literature, 7, 8, 9, 10, 11, 12, 14, 15, 16, 18.
  Public speaking, 3, 4.
  French, 6, 7, 8.
  Spanish, 1, 2.
  German, 6, 7, 8.
  Music, 1.
  Political science, 2, 4, 5, 7.
Mathematics, 7, 10; Physics, 6, 9, 15; Engineering, 8, 11, 12, 13, 14.
Military science, 7, 8.
Physical education, 7, 8, 9, 10.
Rural sociology: (agricultural economics) 4, 5, 7, 9, 10; (rural sociology) 12; (rural law) 14.
Veterinary science, 1, 3, 4.
Zoölogy and geology: —
  Zoölogy, 1, 3, 4, (5, 6, 7).
  Geology, 2.

## B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. Under the heading "Required Courses" are classified all courses that are specifically required of any group of students, although in some cases the same courses are open to other students as electives. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 9, page 9 of the Rules. Announcements of courses that are not given in 1909–10 are inclosed in brackets.]

### *Department of Agricultural Education.*

Professor HART and Mr. JENKS.

#### *Elective Courses.*

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. METHODS. — A study of the subject-matter of agriculture that is appropriate for public schools; the relation of nature work to elementary agriculture; the school garden as a laboratory in connection with the science of biology; the relation of agricultural science to the other sciences. Prerequisite, Course 1 or 2; 2 hours. Credit, 2. Professor HART.

5. SEMINAR IN EDUCATION. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: legislation and agricultural education, the place and value of agricultural science in school courses, etc. Seniors; open, subject to approval of the instructor, to other students; 2 hours. Credit, 2. Professor HART.

6. SEMINAR IN EDUCATION. — As stated under Course 5.
Professor HART.

## DIVISION OF AGRICULTURE.

Professor FOORD, Dr. BROOKS, Assistant Professor LOCKWOOD, Mr. HASKELL, Mr. GRIBBEN.

### SECTIONS.

Agronomy.
Animal Husbandry.
Dairying.
Farm Administration.

[With the exception of the course in elementary agriculture, required in the second semester of the freshman year, the work in agriculture is distributed among four sections: Agronomy, Animal Husbandry, Dairying and Farm Administration.]

### *Agriculture.*

#### *Required Courses.*

2. ELEMENTARY AGRICULTURE. — A brief course touching upon the application of science to the common things of the farm. The work of the agricultural experiment stations and its relation to farm practice will be considered. Lectures, text-book and laboratory. Freshmen; 1 laboratory and 1 lecture period. Credit, 2.

### *Agronomy.*

#### *Required Courses.*

1. SOILS AND FERTILIZERS. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. In the laboratory, a study of the physical properties of soils is made, followed by laboratory and field exercises on the preparation and use of fertilizers. Prerequisite, Chemistry 1 and 2. Sophomores; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

#### *Elective Courses.*

3. FIELD AND FORAGE CROPS. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and

study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

4. FIELD CROP IMPROVEMENT. — A study of the influences determining the yield and value of field crops, and of methods of selecting seed and plant with reference to crop improvement. Particular attention is given to the breeding of plants for early maturity, hardiness and disease resistance, so as to fit them to New England conditions. Lectures, laboratory and field work. Prerequisite, Agronomy 3; 1 lecture and 1 laboratory period. Credit, 2. Mr. HASKELL.

6. ADVANCED SOILS. — Theoretical and practical work on irrigation and drainage; soil survey, with the view of observing the relation between types of soil and its natural vegetation; soil mapping. Lectures, laboratory and library work; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

8. MANURES AND FERTILIZERS. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. BROOKS.

## *Animal Husbandry.*

### *Elective Courses.*

2. TYPES AND BREEDS OF FARM ANIMALS. — A general introductory course. The development, characteristics and adaptability of the more common breeds of farm live stock. Lectures; Plumb's "Types and Breeds of Farm Animals." Sophomores; 2 lecture periods and 1 laboratory period. Credit, 3. Mr. GRIBBEN.

3. PRINCIPLES OF LIVE-STOCK IMPROVEMENT. — A careful study of the principles of inheritance, and a discussion of methods of im-

proving herds or individual animals, of crossing and grading in the production of market and farm stock. Prerequisite, Course 2; 3 lecture periods; library references. Credit, 3. Mr. GRIBBEN.

4. DAIRY CATTLE. — Score cards as applied to breed type and their use in scoring for advanced registry; herd book study. One object is to acquaint the student with the various families of the different breeds, their producing powers and external characteristics. The men who will represent the college in judging contests will be chosen from those electing this course, according to the merit of their work. Text-book, lectures and laboratory work; text-book, Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2. Mr. GRIBBEN.

5. HORSES, SHEEP AND SWINE. — A course similar to Course 4, but dealing with different classes of stock. Of necessity, the study cannot be so detailed as that made in the preceding course, yet a good working knowledge of the judging of these classes is aimed at. The course will consist largely of judging practice, with some periods devoted to lectures, covering such topics as unsoundness in horses and the determination of age in domestic animals. Text-book, lectures and laboratory work. Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2.
Mr. GRIBBEN.

6. FEEDING AND MANAGEMENT OF FARM LIVE STOCK. — The principles of nutrition; their relation to stock feeding; the balanced ration; feeding standards; feed stuffs, method of manufacture, economy to the feeder; economical feeding and management of farm animals; feeding for special purposes (as of dairy cows for records and in preparation for public sales or exhibitions). Text-books and lectures; text-books, Henry's "Feeds and Feeding" and Jordan's "Feeding Farm Animals;" experiment station bulletins. Students electing this course are advised to present Chemistry 5 and 6 and register in veterinary science; 3 hours. Credit, 3.
Mr. GRIBBEN.

### *Dairying.*

#### *Elective Courses.*

1. MILK AND ITS COMPOSITION. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and

developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 3; 2 lecture hours and 1 laboratory period. Credit, 3.
Assistant Professor LOCKWOOD.

2. MARKET MILK. — A study of the market milk conditions, extent and development of the business, supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection; a study of bacteriology relative to milk and dairy work. Must be preceded or accompanied by Animal Husbandry 4. Prerequisite, Course 1; 2 lecture hours and 1 laboratory period. Credit, 3. Assistant Professor LOCKWOOD.

3. BUTTER MAKING. — A study of hand and factory separators, separator construction and cream separation; handling milk and cream for butter making on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy-building construction; plans for dairy buildings, arrangement, ventilation, light, sanitation; dairy machinery and care thereof; practical mechanics as applied to the creamery; cement construction as related to dairy construction work. Prerequisites, Courses 1 and 2; 2 lecture hours and 1 laboratory period. Credit, 3.
Assistant Professor LOCKWOOD.

4. MANUFACTURED MILK PRODUCTS. — Manufacture of other dairy products than butter. Cheddar and fancy cheeses; condensed milks; whey butter, cottage cheese, ice cream, casein, milk powder, etc.; dairying in other countries; library work. Must be preceded or accompanied by Animal Husbandry 6. Prerequisites, Courses 1, 2 and 3; 2 lecture hours and 1 laboratory period. Credit, 3.
Assistant Professor LOCKWOOD.

### *Farm Administration.*

#### *Elective Courses.*

3. Farm Equipment. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3.

Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3. Professor Foord.

## *Department of Botany.*

Professor Stone, Assistant Professor Osmun, Mr. Jennison.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

#### *Required Courses.*

2. Histology, Physiology, Morphology and Classification of Plants. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analy-

sis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; three 2-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN and Mr. JENNISON.

### *Elective Courses.*[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; three 2-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; one 2-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; one 2-hour laboratory and one 1-hour lecture period. Credit, 2.

Professor STONE, Assistant Professor OSMUN and Mr. JENNISON.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of

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[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; three 3-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; two or three 3-hour laboratory periods and one 1-hour lecture period. Credit, 4 or 5. Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9. Professor STONE.

11. PLANT PHYSIOLOGY. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; three 3-hour laboratory periods and one 1-hour lecture period. Credit, 5. Professor STONE.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11. Professor STONE.

13. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; two 3-hour laboratory periods and one 1-hour lecture period. Credit, 4. Professor STONE.

14. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — As stated in Course 13. Prerequisite, Course 13. Professor STONE.

## *Department of General and Agricultural Chemistry.*

Professor WELLINGTON, Assistant Professor HOWARD, Dr. MACLAURIN, Mr. FOWLER, Mr. SHAW.

[The courses in chemistry aim to teach accurate observation, logical thinking and systematic and constant industry, together with a comprehensive knowledge of the subjects presented. Instruction is given through text-books, lectures and a large amount of laboratory work under supervision. The laboratory work at first consists of the study of the properties of elementary matter, the analysis of simple combinations, and their artificial preparation. This is followed by the quantitative analysis of salts, minerals, soils, fertilizers and the chemistry of various manufacturing industries, especially those of agricultural interest, such as are concerned in the production of sugar, starch and dairy products; the preparation of animal and plant foods, their digestion, assimilation and economic use; and the official analysis of soils, insecticides, fungicides, waters, milk, wine, and other animal and vegetable products.]

### *Required Courses.*

1. THE NON-METALS. — An introduction to chemical laws. The commoner non-metallic elements, their occurrence in nature, and their uses in the arts, are studied. Lectures and laboratory exercises; Alex. Smith's "General Inorganic Chemistry." Freshmen; 4 hours. Credit, 3. Assistant Professor HOWARD.

2. THE COMMON METALS. — This course extends the study of Course 1 to the metals common in the arts, and includes blowpipe analysis and elementary determinative mineralogy. Lectures, recitations and laboratory exercises. Prerequisite, Course 1. Freshmen; 4 hours. Credit, 3. Assistant Professor HOWARD.

### *Elective Courses.*

4. QUALITATIVE AND QUANTITATIVE ANALYSIS. — A two-part course for students who wish to become acquainted with only a limited field of analysis. Lectures and laboratory work; Treadwell-Hall's "Analytical Chemistry." Prerequisite, Course 2; sophomores; 6 hours. Credit, 3. ————————

5. ORGANIC CHEMISTRY. — A systematic study of the origin and relationships of carbon compounds, particularly those occurring in plants and animals. Prerequisite, Course 4. Juniors; lectures 3 hours, laboratory 2 hours. Credit, 4. Dr. MACLAURIN.

6. CHEMISTRY OF PLANT AND ANIMAL LIFE. — In this course the commoner chemical reactions in plant and animal bodies are

studied. The ordinary processes of digestion, assimilation, secretion and excretion are examined in detail. Prerequisite, Course 5. Juniors; lectures 3 hours, laboratory 2 hours. Credit, 4.

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7. CHEMISTRY OF PLANT AND ANIMAL LIFE. — This course takes up the study of physiological chemical processes beyond the scope of Course 6, and is open only to students who have attained marked proficiency in that course. By arrangement. Credit, 5.

Mr. SHAW.

9. ADVANCED ANALYSIS. — For those who wish to acquire skill in chemical analysis. Students intending to enter experiment-station or chemical-control work have here an opportunity to become familiar with the processes concerned. Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

Professor WELLINGTON.

10. ADVANCED ANALYSIS. — As stated under Course 9. Prerequisite, Course 9. Credit, 5.

Professor WELLINGTON.

11. PHYSICAL CHEMISTRY. — Prerequisites, Courses 4 and 5. Seniors; lectures 2 hours. Credit, 2.

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12. ANALYSIS OF FOODS AND FODDERS. — Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

Mr. FOWLER.

14. ANALYSIS OF FERTILIZERS, INSECTICIDES AND FUNGICIDES. — Prerequisite, Course 4. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5. Professor WELLINGTON.

16. CHEMISTRY OF SUGAR MAKING AND REFINING. — Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5. Professor WELLINGTON.

## *Department of Entomology.*

Prof. C. H. Fernald, Prof. H. T. Fernald, Mr. Summers.

[A knowledge of insects is of importance in every department of life, and particularly in connection with agriculture, horticulture, biology, landscape gardening and forestry; it therefore forms part of a general education. An introductory course in this subject is accordingly offered in the junior year. For those who desire a further knowledge of the subject, because of its importance to their future occupation, a senior course is also offered, so arranged as to be of especial value for those who expect to take up agriculture, horticulture, landscape gardening, forestry or science teaching.]

### *Elective Courses.*

2. General and Economic Entomology. — This course comprises studies in the structure of insects as applied to their identification, and in the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collection and in the field, and methods for their control. The most important insecticides, and their preparation and application with different kinds of apparatus, are also treated. Field work in collecting insects is a part of the course; and this is accompanied by laboratory work on methods of pinning, pressing and mounting insects, and of classifying them. Juniors; four 1-hour lecture periods till about May 1; thereafter one 1-hour lecture period and three 2-hour laboratory or field periods. Credit, 4. Prof. H. T. Fernald.

3. Advanced Entomology. — This course is subdivided according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

*A. Morphology.* — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

*B. Histology.* — Lectures on the internal anatomy and the histology of the various organs, with particular reference to those affected by the various insecticides.

*C. Insecticides and Apparatus.* — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects, tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work on adulterated materials.

*D. Coccidology.* — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

*E. Bibliography.* — Studies of the various sources of entomological publications and of the methods of finding the literature on any insect.

*F. Special Studies.* — In these studies the insects most closely related to the future occupation of the student will receive attention.

The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the structure, life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; one 1-hour lecture period and three 2-hour laboratory or field periods. Credit, 4.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

## DIVISION OF HORTICULTURE.

Professor WAUGH, Professor SEARS, Assistant Professor WHITE, Mr. TOMPSON, Mr. RANE, Mr. GRACEY.

### DEPARTMENTS.

Horticulture.
Pomology.
Floriculture.
Landscape Gardening.
Market Gardening (Section).
Drawing (Section).

### *Department of Horticulture.*

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of Horticulture.]

#### *Required Courses.*

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation —

as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Professor SEARS.

### *Elective Courses.*

3. ARBORICULTURE. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2. Juniors; 2 lecture periods and 1 laboratory period. Credit, 3.

Assistant Professor WHITE.

4. PLANT BREEDING. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and one 2-hour laboratory period. Credit, 3.

Professor WAUGH.

5. THE LITERATURE OF HORTICULTURE. — A broad seminar course, with extended readings, covering the entire field of horticulture. Typical modern works are first studied, including representative authors and the leading publishers. Consideration is given to books, periodicals and bulletins of all kinds, with a view to securing a comprehensive view and a working knowledge. Study and reference methods are given special attention. After a good command of current literature is secured, older works are taken up and the forces and direction of development are pointed out. A special study is made of the old herbals. Finally, the relation of horticultural literature to horticultural practice is summarily sketched. Graduates and undergraduates. Credit, 2.

Professor WAUGH.

*A.* *Forestry.* — A short course of lectures and field exercises, to introduce students to the general principles of forestry management, including nursery work, sylviculture, forest mensuration and exploitation, with special reference to the management of farm woodlots. This course is given annually by special arrangement with the State Forester of Massachusetts.[1] Mr. RANE.

### *Department of Pomology.*

#### *Elective Courses.*

1. PRACTICAL POMOLOGY. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor SEARS.

2. PRACTICAL POMOLOGY. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor SEARS.

3. SYSTEMATIC POMOLOGY. — A study of the varieties of the different fruits and of nomenclature and the identification of varieties, with critical descriptions and special reference to relationships and classifications. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3. Professor SEARS.

4. COMMERCIAL POMOLOGY. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3. Professor SEARS.

### *Department of Floriculture.*

#### *Elective Courses.*

1. GREENHOUSE MANAGEMENT. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical

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[1] Additional courses in forestry for the year 1909–10 will be announced soon.

operation of greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 3.
Assistant Professor WHITE.

2. GREENHOUSE DESIGN AND CONSTRUCTION. — A study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisites, Floriculture 1; 5 hours. Credit, 3.
Assistant Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Assistant Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisite, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Assistant Professor WHITE.

### *Department of Landscape Gardening.*

#### *Elective Courses.*

1. ELEMENTS OF LANDSCAPE GARDENING. — Reconnoissance surveys and mapping; detailed study of selected works of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, arboriculture and drawing. Must be followed by Course 2. Juniors; 7 hours a week. Credit, 4. Professor WAUGH and Mr. GRACEY.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.

Professor Waugh and Mr. Gracey.

3. General Landscape Gardening. — Field notes; examination of completed works and those under construction; design of architectural details; planting plans; estimates; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either arboriculture (Horticulture 3) or advanced mathematics; must be followed by Course 4; 7 hours. Credit, 4.

Professor Waugh.

4. General Landscape Gardening. — As stated under Course 3. Prerequisite, Course 3. Professor Waugh.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.

Professor Waugh.

6. Ornamental Gardening. — An elementary course for students who take no other work in landscape gardening. The general principles and their simpler applications, such as the ornamental planting of farm yards, school grounds and streets, the care of estates, etc. Text-book, Waugh's "Landscape Gardening." 3 hours. Credit, 3. Mr. Gracey.

### *Market Gardening.*

#### *Elective Courses.*

2. Elements of Market Gardening. — This course consists of a study of the elements and fundamental problems of market gardening, with careful study of such subjects as garden soils, garden fertilizers and systems of planting and cultivation. The principal garden crops are studied. Lectures and practical exercises. Juniors; prerequisite, Horticulture 1; 3 hours. Credit, 3.

Mr. Tompson.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of harvesting, storing and marketing. Considerable time is devoted to growing vegetables under glass, and special and novel vegetable

crops are studied. Careful note-taking and considerable collateral reading are required. Floriculture 1 must be taken in connection with this course. Seniors: prerequisite, Market Gardening 2; 5 hours. Credit, 3. Mr. TOMPSON.

### *Drawing.*

#### *Elective Courses.*

[1. FREEHAND DRAWING. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. Not given in 1909–10. Juniors; 6 hours. Credit, 3. Mr. GRACEY.]

2. MECHANICAL DRAWING. — Inking exercises; geometric problems; projection; intersections; isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. GRACEY.

## DIVISION OF THE HUMANITIES.

Professor MILLS, Assistant Professor NEAL, Assistant Professor HOLCOMB, Mr. MACKIMMIE, Mr. ASHLEY, Mr. GREEN.

#### DEPARTMENTS.

English.
Modern European Languages.
Music (Section).
Political Science.
Library.

### *Department of English.*

English Language.
Literature.
Public Speaking.

[Enrolment in the elective courses in the Department of English is subject to the approval of the instructor. The membership in several of the courses is strictly limited; hence students are advised to plan their work well in advance in order to be sure of completing the required three hours of post-sophomore English. This credit must be made up without taking Literature 15 or 16. In each semester, the students enrolled in elective courses in English are expected to take part in the meetings of the English Conference, which consists of the instructors and students in the Department of English. The meetings of the Conference are held once every four weeks, or oftener, between October 1 and June 7.]

### ENGLISH LANGUAGE.

*Required Courses.*

1. FRESHMAN ENGLISH. — Composition; introduction to literature. Recitations and lectures; theme writing; conferences[1] weekly or fortnightly; declamation at option of instructor. Freshmen; 5 hours. Credit, not including declamation, 4; including declamation, 5. The DEPARTMENT.

2. FRESHMAN ENGLISH. — As stated under Course 1. Prerequisite, Course 1. The DEPARTMENT.

3A and 3. SOPHOMORE ENGLISH. — Composition; literature. These courses supplement Courses 1 and 2, and add instruction in the use of the library. Course 3 open only to sophomores whose work in Courses 1 and 2 reaches a standard satisfactory to the department; Course 3A required of all others. Prerequisite, Course 2; sophomores; 2 hours for 3A, 1 hour for 3. Credit, 2 and 1 respectively. The DEPARTMENT and Mr. GREEN.

4A and 4. SOPHOMORE ENGLISH. — As stated under Courses 3A–3, which are respectively prerequisite to these courses.
The DEPARTMENT and Mr. GREEN.

5. TRAINING COURSE. — A special course that follows and enlarges upon the study outline of Courses 1 and 2. Required of the readers in English; open, with approval of instructor, to candidates for appointment as readers, and therefore may be taken with full credit by approved sophomore students in place of English 3 and 4. One hour, with a second hour at the option of the instructor. Credit, 2. The DEPARTMENT.

6. TRAINING COURSE. — As outlined under Course 5.
The DEPARTMENT.

*Elective Courses.*

[7. ADVANCED COMPOSITION. — A course varying in plan, but usually concerned with some form of exposition, description or narration. In 1908–09, it dealt mainly with narration and character portrayal. Lectures or text-book assignments; studies of types; exercises; long papers. Given every other year; not given in 1909–10. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.]

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[1] Student theme-readers for 1908–09: Herbert Linwood White, '09; Josiah Chase Folsom, '10; Samuel Weis Mendum, '10; George Murray Brown, Jr., '09 (first semester); Charles Howard White, '09 (first semester); Henry Alvan Brooks, '10 (second semester); Edward Harrison Turner, '10 (second semester).

9. AGRICULTURAL JOURNALISM. — Lectures as in Course 11, and the production of "copy" adapted to the use of agricultural periodicals. The class, organized as an editorial staff, is charged with the publication of an agricultural periodical (see Course 11). This periodical is submitted for discussion to the Stockbridge Club. The instructors in the agricultural subjects criticise the substance of the articles; the instructor in the course criticises style and "make-up." Given every other year; to be given in 1909–10. Students enrolling must, to secure credit, also take Course 10. One hour, with a second hour at the option of the instructor. Credit, 1.
Assistant Professor NEAL.

10. AGRICULTURAL JOURNALISM. — As stated under Course 9. Prerequisite, Course 9. Assistant Professor NEAL.

11. PERIODICAL WRITING. — Lectures on the elements of journalism — newspaper and magazine writing, reporting, editing, printing, etc. — and the production of "copy" under conditions as nearly as possible like those under which newspaper and magazine writing is carried on. The class, organized as an editorial staff, is to issue a periodical. It is responsible for "covering" events; determining the subjects to be treated and the manner of treatment; accepting and rejecting articles; desk editing, copy and proof reading; making "dummies" and writing legends for illustrations; completing "forms" and "publishing" the periodical upon schedule time, etc. Given every other year; to be given in 1909–10. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

[13. PROSEMINAR IN JOURNALISM. — Informal, beginning with a study by individual students of editorial writing and of types of magazine writing, such as "descriptive" articles, research articles, "human interest" articles, and articles in "popularized" science. Members of the class are expected to formulate through these studies theories of journalism and journalistic writing, to state them in thesis form and to produce articles of the kinds studied. Reference reading and reports upon current periodicals may be

called for. Prerequisite, either Course 11 or Courses 9 and 10. Given every other year; not given in 1909–10. One hour, with a second hour at the option of the instructor. Credit, 1.
Assistant Professor Neal.]

[14. Proseminar in Journalism. — As stated under Course 11.
Assistant Professor Neal.]

15. English Language. — See Literature 15.
16. English Language. — See Literature 16.

### Literature.

#### *Required Courses.*

1, 2, 3A, 3, 4A, 4, 5 and 6. — See the courses so numbered under English Language.

#### *Elective Courses.*

7. Individual Reading. — Cultural reading courses. Students must, when enrolling, present in writing a detailed statement of the reading they purpose to do. The reading must be sufficient to require forty-five hours; must be strictly non-technical; may be in any subject; and may be taken in any department by arrangement between the student and the instructor in the department concerned. If the reading be taken outside the Department of English, the student must, before presenting his outline of reading, secure in writing the endorsement thereof by the instructor under whom he is to read. Each student must prepare a two thousand word thesis upon his reading, and this thesis must be presented by the fourth Wednesday before the beginning of senior examinations. It must be accompanied with a written statement from the supervising instructor that the reading as outlined has been satisfactorily completed, and that the thesis is satisfactory in subject-matter. Prerequisite, the sophomore courses in English; total credits allowed on Courses 7 and 8 in any two years, 2. Credit, 1.
The Department.

8. Individual Reading. — As stated under Course 7.
The Department.

9. Elizabethan Literature (1557–1637). — Lectures, text-book or reference assignments, or class-room interpretation of authors; much outside reading; written studies upon announce-

ment. Not given in 1910–11. Prerequisite, the sophomore courses in English. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

10. PURITAN AND RESTORATION LITERATURE (1616–1700). — The same in plan, requirements and hours as Course 9. Not given in 1910–11. Assistant Professor NEAL.

[11. EARLY EIGHTEENTH CENTURY LITERATURE (1700–1740).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1910–11.
Assistant Professor NEAL.]

[12. MIDDLE EIGHTEENTH CENTURY LITERATURE (1740–1780).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1910–11.
Assistant Professor NEAL.]

[13. TRANSITION EIGHTEENTH–NINETEENTH CENTURY LITERATURE (1780–1815).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1911–12.
Assistant Professor NEAL.]

[14. EARLY NINETEENTH CENTURY LITERATURE (1800–1832).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1911–12.
Assistant Professor NEAL.]

18. ADVANCED LITERARY STUDY. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types. Prerequisite, the sophomore courses in English; but those students who have taken or are taking courses in literary history or general reading will be the better prepared to take Course 18 with profit. In 1909–10, Shakspere; in 1910–11, the English novel. — Shakspere: The interpretation of two plays in class and the reading of three others outside; the life of Shakspere; collateral reading. Tests and examinations. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

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[1] In 1908–09, Courses 11–14 were given as a single course, open to juniors only.

15. English Language and Literature. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Seniors; 3 hours. Credit, 3. Professor Mills.

16. English Language and Literature. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Seniors; 3 hours. Credit, 3. Professor Mills.

### Public Speaking.

*Required Courses.*

1. Declamation. — Freshman course, included under Courses 1 and 2 in English Language. A credit amounting to 1 hour for one semester is given in Courses 1 and 2 together.

2. Declamation. — As in Course 1.

*Elective Courses.*

3. Oration. — Announcement to be made.

4. Argumentation and Debate. — Announcement to be made.

## *Department of Modern European Languages.*

### French.

*Required Courses.*

1. Elementary French. — A beginning course. Frazer & Squair's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4. Mr. Mackimmie.

2. Elementary French. — As stated under Course 1. Prerequisite, Course 1. Mr. Mackimmie.

A1. Second-year French. — Elementary and easy sight reading; grammar, Frazer & Squair's "Grammar," part II.; composi-

tion and reports. Intended for those freshmen who enter in 1909 under the old requirements with only one year of French; not to be given after 1909–10. Freshmen; 4 hours. Credit, 4.
Mr. MACKIMMIE.

A2. SECOND-YEAR FRENCH. — As stated under Course A1. Prerequisite, Course A1. Mr. MACKIMMIE.

3. INTERMEDIATE FRENCH (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. MACKIMMIE.

4. INTERMEDIATE FRENCH. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. MACKIMMIE.

5. ADVANCED FRENCH (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.
Mr. MACKIMMIE.

### *Elective Courses.*

6. ADVANCED FRENCH (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatist will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Mr. MACKIMMIE.

7 and 8. FRENCH LANGUAGE OR LITERATURE (fourth year). — Courses in more advanced subjects; to be announced; 3 hours. Credit, 3. Mr. MACKIMMIE.

## SPANISH.

### *Elective Courses.*

1. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. MACKIMMIE.

2. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. MACKIMMIE.

### GERMAN.

*Required Courses.*

1. ELEMENTARY GERMAN. — Grammar and composition; the reading of short stories, poems, plays, etc. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. ASHLEY.

2. ELEMENTARY GERMAN. — As stated under Course 1. Prerequisite, Course 1. Mr. ASHLEY.

3. INTERMEDIATE GERMAN. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar; outside readings. Required of freshmen who present German for entrance and do not take French, and of sophomores who took Courses 1 and 2 as freshmen. Freshmen and sophomores; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. ASHLEY.

4. INTERMEDIATE GERMAN. — As stated under Course 3, but not required of sophomores who took Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. ASHLEY.

5. ADVANCED GERMAN. — The rapid reading of selections from the best authors (novels and dramas); outside reading in German periodicals of selected articles concerning various subjects and designed to promote research and reference work. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Mr. ASHLEY.

*Elective Courses.*

6. ADVANCED GERMAN. — As stated under Course 5; sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Mr. ASHLEY.

7. READINGS AND INVESTIGATIONS. — The reading of novels and journals; presentation by members of class of reports on period-

ical articles; reports upon assigned reference work in encyclopedias; 3 hours. Credit, 3. Mr. Ashley.

8. Readings and Investigations. — As stated under Course 7. Mr. Ashley.

### *Music.*

#### *Elective Courses.*

1. History and Interpretation of Music. — The lives and works of famous composers from Händel to Grieg, with exposition on the pianoforte of representative works; text-book; 1 hour. Credit, 1. Mr. Ashley.

## *Department of Political Science.*

#### *Required Courses.*

1. Economics. — Text-books and assigned reading. For reference reading the class is divided into six groups, each student being allowed to choose any one of six subjects of investigation, according to his tastes and probable future career. The class is acquainted with the substance of the reading assigned to each group by means of weekly papers read by members of the respective groups. Must be taken a[illegible] prerequisite to graduation; 3 hours. Credit, 3.
Assistant Professor Holcomb.

#### *Elective Courses.*

2. Government. — The local, State and federal governments of the United States, and the constitutional history of Massachusetts; features of local government peculiar to Massachusetts or to New England; lectures on the history of political parties. Emphasis is laid on the period beginning with the close of the civil war. Text-books and lectures; 3 hours. Credit, 3.
Assistant Professor Holcomb.

4. Economic History. — The economic history of England to the reign of Henry VIII.; the history of England and the American colonies in conjunction to 1783; and thereafter the history of England and of the United States. Emphasis is laid on economic history, but the more important political and religious movements are treated in their economic relations. Text-books, lectures and assigned reading; 3 hours. Credit, 3.
Assistant Professor Holcomb.

5. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fullness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading. Given every other year; given in 1909–10; 3 hours. Credit, 3. Assistant Professor HOLCOMB.

[7. THE HISTORY OF IDEALS. — This course is intended to supplement Course 4, treating history from the idealistic, rather than from the economic, point of view. It attempts to define the great ideals which have impelled the most important social, political, esthetic, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. The ideals of Christianity, including monasticism, modern Catholicism and Protestantism; of medieval art and architecture; of political and social democracy, including universal suffrage, the abolition of slavery, modern socialism and social reform — may be taken as examples. Lectures and required reading. Although Course 4 is not a prerequisite to this course, students should take both. Given every other year; not offered in 1909–10; 3 hours. Credit, 3.
Assistant Professor HOLCOMB.]

## *Department of Mathematics, Physics and Civil Engineering.*

Professor OSTRANDER, Associate Professor HASBROUCK, Mr. DUNCAN.

### *Required Courses.*

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; binomial theorem, undetermined coefficients, summation of series, continued fractions, logarithms, theory of equations. Wells's "College Algebra." Freshmen; 5 hours a week. Credit, 5.
Associate Professor HASBROUCK and Mr. DUNCAN.

2. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical

triangles and the measurement of surfaces and solids. Wells's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY. — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.
Associate Professor HASBROUCK.

5. GENERAL PHYSICS. — Elementary mechanics and heat. Lectures, recitations and laboratory work. Text, Crew's "General Physics." Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5.
Adjunct Professor HASBROUCK and Mr. DUNCAN.

*Elective Courses.*

6. GENERAL PHYSICS. — Electricity and light. Crew's "General Physics." Lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.
Adjunct Professor HASBROUCK and Mr. DUNCAN.

[9. ADVANCED PHYSICS. — The senior elective in physics will not be offered for the year 1909–10.
Adjunct Professor HASBROUCK.]

8. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.
Professor OSTRANDER and Mr. DUNCAN.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Wentworth's "Analytic Geometry." Prerequisites, Mathematics 1, 2 and 4; 3 hours a week. Credit, 3. Professor OSTRANDER.

10. — DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 4 and 7; 5 hours. Credit, 5.
Professor OSTRANDER.

11. HYDRAULICS AND SANITARY ENGINEERING.[1] — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures, 3 hours. Not given in 1910–11. Credit, 3.
Professor OSTRANDER.

12. ADVANCED SURVEYING.[1] — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures. Not given in 1910–11; 6 hours. Credit, 5. Professor OSTRANDER.

[13. STRESSES IN STRUCTURES.[1] — An elementary course in roof and bridge stresses. Text-book and lectures. Not given in 1909–10; 4 hours. Credit, 3. Professor OSTRANDER.]

[14. STRENGTH OF MATERIALS, FOUNDATIONS AND MASONRY CONSTRUCTION.[1] — Text-book and lectures. Not given in 1909–10; 5 hours. Credit, 5. Professor OSTRANDER.]

[15. ANALYTIC MECHANICS. — A course in theoretical mechanics, based on the calculus, with applications to problems. Text-book and lectures. Prerequisites, Mathematics 7, 10; not given in 1909–10; 3 hours. Credit, 3. Professor OSTRANDER.]

## *Department of Military Science and Tactics.*

### Captain MARTIN.

[The department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision, and be completed by the beginning of the senior year. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

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[1] Instruction in civil engineering will be given in two distinct courses of one year each, the courses alternating. The courses are open to students of the junior and senior classes.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms to members of an entering class is prohibited, unless the consent of the military instructor be obtained.]

### *Required Courses.*

1. INTRODUCTION TO MILITARY SCIENCE AND TACTICS. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess and second semester after Easter recess; 3 hours. Credit, 2.
Captain MARTIN.

2. INTRODUCTION TO MILITARY SCIENCE AND TACTICS. — As stated under Course 1. Captain MARTIN.

3. PRACTICE AND THEORY OF MILITARY SCIENCE AND TACTICS. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Theoretical instruction in infantry drill regulations, to include the school of the company; manual of guard duty; small arms firing regulations. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess and second semester after Easter recess; 3 hours, with an average in addition of 1 hour of instruction in theory for the full year. Credit, 2.
Captain MARTIN.

4. PRACTICE AND THEORY OF MILITARY SCIENCE AND TACTICS. — As stated under Course 3. Captain MARTIN.

5. PRACTICE AND THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — Practical instruction as before; target practice, in gal-

lery and on the range. Theoretical instruction in infantry drill regulations; to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; field service regulations; preparation of reports, returns, muster rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess and second semester after Easter recess; 3 hours, with an average in addition of 1 hour of instruction in theory for the full year. Credit, 2. Captain MARTIN.

6. PRACTICE AND THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — As stated under Course 5. Captain MARTIN.

*Elective Courses.*

7. ADVANCED MILITARY SCIENCE AND TACTICS. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 7 and 8 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors electing Courses 7 and 8 are required to report for three hours of work a week in the Department of Physical Education when drill is suspended. Seniors; first semester until Christmas recess and second semester after Easter recess; 3 hours. Credit, 2. Captain MARTIN.

8. ADVANCED MILITARY SCIENCE AND TACTICS. — As stated under Course 7. Captain MARTIN.

## *Department of Physical Education and Hygiene.*

Assistant Professor REYNOLDS.

### HYGIENE.

*Required Courses.*

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1. Assistant Professor REYNOLDS.

### PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering. A similar examination is given at the beginning of the athletic seasons to all candidates for training for class or college athletic contests.]

#### *Required Courses.*

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1. Assistant Professor REYNOLDS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

4. GRADED GYMNASTICS. — As stated under Course 3. Assistant Professor REYNOLDS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

6. HEAVY GYMNASTICS. — As stated under Course 5. Assistant Professor REYNOLDS.

#### *Elective Courses.*

7. TRAINING COURSE. — Leadership of class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

8. TRAINING COURSE. — As stated under Course 7. Assistant Professor REYNOLDS.

9. ADVANCED GYMNASTICS. — For those who wish to become candidates for the gymnastic team. Credit, 0. Assistant Professor REYNOLDS.

10. ADVANCED GYMNASTICS. — As stated under Course 9. Assistant Professor REYNOLDS.

### *Department of Rural Social Science.*

President BUTTERFIELD, MR. LYMAN, DR. CANCE.

#### AGRICULTURAL ECONOMICS.

*Required Courses.*

2. AGRICULTURAL INDUSTRY AND RESOURCES. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Dr. CANCE.

*Elective Courses.*

4. ELEMENTS OF AGRICULTURAL ECONOMICS. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; the agricultural market; determination of price; speculation; problems of land tenure and land values; business co-operation; farmers' organizations; the farmer and legislation; the maintenance of the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Dr. CANCE.

5. HISTORICAL AND COMPARATIVE AGRICULTURE. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to affect agricultural changes. Lectures, readings and library work. Seniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Dr. CANCE.

7. SPECIFIC PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems; land tenure; size of farms; causes affecting land values; private property in land; taxation and inheritance; special problems; marketing and manufacturing farm products; co-operative enterprises and farmers' societies; cost of production; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 hours a week. Credit, 2. Dr. CANCE.

9. SEMINAR. — Research in agriculture: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1. Dr. CANCE.

10. SEMINAR. — As stated in Course 9. Dr. CANCE.

### RURAL SOCIOLOGY.

12. THE RURAL COMMUNITY. — There are two general divisions of the subject. There is, first, a study of the social status of the rural population, including the significance of the movement to the cities, the present social conditions of farm people, the social effects of rural life, and the social aspect of various agricultural questions of a technical or economic character. In the second part of the study will be discussed the various social agencies in rural progress, such as means of communication, farmers' organizations, rural schools, means of agricultural education, rural religious institutions and the federation of rural social agencies. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3. President BUTTERFIELD.

### RURAL LAW.

14. RURAL LAW. — This course treats of the laws relating to business, especially business associated with rural affairs, and of those relating to citizenship, domestic relations, farming contracts, riparian rights, real estate and conveyancing. Lectures; practical work such as may fit one to perform the duties of a justice of the peace. Seniors; 1 hour. Credit, 1. Mr. LYMAN.

## *Department of Veterinary Science.*

Professor PAIGE.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

### *Elective Courses.*

1. INTRODUCTORY BACTERIOLOGY. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; three 2-hour laboratory exercises. Credit, 3. Professor PAIGE.

3. VETERINARY SCIENCE. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor PAIGE.

4. VETERINARY SCIENCE. — As stated under Course 3.
Professor PAIGE.

## *Department of Zoölogy and Geology.*

### ZOÖLOGY.

### *Required Course.*

1. ELEMENTARY ZOÖLOGY. — This forms the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; two 2-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

### *Elective Courses.*

3. INVERTEBRATE ZOÖLOGY. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate

Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 3. Juniors; two 2-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; two 2-hour laboratory periods and 1 lecture hour. Credit, 3.
Assistant Professor GORDON.

5, 6 and 7. ADVANCED ZOÖLOGY. — See Graduate School.

### GEOLOGY.

#### *Elective Courses.*

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; one 2-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

# THE GRADUATE SCHOOL.

# THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., President of the College.
CHARLES H. FERNALD, Ph.D., Director of the Graduate School and Professor of Zoölogy.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

## ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

## Nature and Methods of Graduate Work.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

## THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

The thesis in its final form, ready for the printer, must be submitted to the director of the school for examination by the committee on the graduate school before the candidate for the doctor's degree may take the required oral examination. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in the thesis.

All theses become the property of the department in which they are prepared. When they are printed, five copies of each thesis must be deposited with the department.

## FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

## DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

### Courses for Degree of Master of Science.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.

### Courses for the Degree of Doctor of Philosophy.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zoölogy.

## GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

### (*a*) *Major Courses.*

BOTANY: — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The following subjects in chemistry may be studied: —

(*a*) Inorganic analysis, qualitative (of the rarer elements) and quantitative.
(*b*) Crystallography.
(*c*) Physical chemistry.
(*d*) Descriptive and determinative mineralogy.
(*e*) Chemical geology.
(*f*) Soil formation.
(*g*) Soil physics and chemistry; gas analysis; synthetic inorganic work.
(*h*) Chemical theory and history.
(*i*) General organic chemistry.
(*j*) Special topics in organic chemistry.

(*k*) Elementary quantitative organic analysis.
(*l*) Proximate qualitative and quantitative organic analysis, including determination of organic radicles.
(*m*) Organic synthesis of aliphatic and aromatic compounds.
(*n*) Problems in chemical manufacture.
(*o*) Recent chemistry of plant nutrition.
(*p*) Animal physiological and pathological chemistry, including the chemistry of foods, of milk and milk industries, of urine, urinalysis, and the standards for feeding of all kinds.
(*q*) Toxicology.
(*r*) Insecticides and fungicides.

Frequent examinations on current chemical literature are given. Early in the course original work on some chemical subject pertaining to agriculture must be begun. The history and results of this work must, before the awarding of the degree, be submitted in the form of a thesis containing a distinct contribution to knowledge.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogamy; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photography of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology under these conditions.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

### (*b*) *Minor Courses.*

ZOÖLOGY. — The courses in zoölogy are offered as a minor course to candidates for the degree of doctor of philosophy. They constitute an intensive course designed to give a broad outlook and to meet the needs of the specialist, and call for original investigation, laboratory dissection, technique and museum work. The subjects treated and the work done will vary according to circumstances, but may be outlined thus: —

(*a*) General and comparative anatomy, both gross and microscopic; ontogeny and phylogeny; life cycles, metamorphosis and metagenesis; animal associations, colonial, commensal and parasitic, and symbiotic associations of animals and plants; adaptation, adaptive radiation and parallelisms.

(*b*) Geologic, geographic and bathymetric distribution of animals.

(*c*) Systematic zoölogy, including paleozoölogy; museum and field technique.

(*d*) Economic zoölogy.

(*e*) History and development of zoölogical science.

(*f*) Weekly seminar and journal club meetings, in which all advanced students of zoölogy take an active part.

(*g*) Collateral reading; general knowledge of current zoölogical literature.

OTHER SUBJECTS. — Courses in the other subjects open to choice as minors will be outlined according to the qualification and needs of the students applying for them.

# SHORT COURSES.

# SHORT COURSES.

## SUMMER SCHOOL.

### *Purposes and Methods.*

The summer school of the Massachusetts Agricultural College was organized in 1907, under an act of the Legislature authorizing a normal department at the college. The main purpose has from the first been to train teachers in elementary agriculture and nature study, so that these subjects may be effectively presented in the schools. The work, however, was considerably broadened in 1908, there being two principal innovations: (*a*) the addition of a considerable number of technical courses in agriculture and horticulture, without special reference to the needs of teachers; and (*b*) the addition of courses in rural sociology and economics for the special benefit of country clergymen. Some further extension of the work may be expected in 1909. Most of the instruction is given outdoors in demonstration, practicums and observation exercises. Instructors are chosen from the faculty of the Massachusetts Agricultural College and elsewhere.

### *Faculty (1908).*

KENYON L. BUTTERFIELD, President of the college.
Prof. FRANK A. WAUGH, Dean of the summer school; School Gardening.
Asst.-Prof. EDWARD A. WHITE, Floriculture and Arboriculture.
Prof. G. E. STONE, Plant Physiology.
Asst.-Prof. A. VINCENT OSMUN, Plant Life.
Prof. W. D. HURD (University of Maine), Field Crops and Agricultural Industry.
Prof. T. N. CARVER (Harvard University), Agricultural Economics.
Prof. H. T. FERNALD, Insect Life.
Prof. J. A. FOORD, Soils and Tillage.
Mr. R. L. GRIBBEN, Domestic Animals.
Prof. W. R. HART, Agricultural Pedagogy.
Mr. F. B. JENKS, High School Agriculture.
Prin. A. C. MONAHAN (Turners Falls High School), High School Chemistry.
Mr. H. F. TOMPSON, Practical Gardening.
Prof. W. H. DUDLEY (Wisconsin Normal School), Bird Life.
Mr. F. M. GRACEY, Drawing.

### *Courses of Study.*[1]

1. Agricultural Pedagogy. — Pedagogy with reference to its vocational aspects; the growth and function of professional and technical schools, with suggestions of the meaning of agriculture in modern education. Part of the course bears directly upon the materials and methods of teaching agriculture in the elementary grades. Five exercises weekly for first four weeks.

Professor Hart.

2. High School Agriculture. — The organization of high schools for the teaching of agriculture; equipment, courses of study, etc. A major portion of the course will be devoted to actual exercises, largely practicums, suitable for use in high schools. Five exercises weekly for first four weeks. Mr. Jenks.

3. High School Chemistry. — Courses of study and equipment for general high school chemistry, with special reference to agriculture and the industries, with a considerable number of practical exercises designed to show how agricultural and industrial matters may be introduced into high school courses with advantage. Five exercises weekly for first four weeks.

Mr. Monahan.

4. Soils and Tillage. — The chemical, physical and biological composition of the soil, and the relation of each to plant growth; the formation of soils; natural and artificial sources of fertility; the methods and implements of tillage: the whole forming an introduction to modern scientific agriculture. Five exercises weekly for the first two weeks. Should be followed by Course 5.

Professor Foord.

5. Field Crops. — Class room, laboratory and field exercises designed to show modern methods of managing the principal field crops of New England, such as the grasses, the clovers, corn, potatoes, etc. Five exercises weekly for second two weeks. Should be preceded by Course 4. Professor Hurd.

6. Domestic Animals. — The different breeds of horses, cattle, swine, etc.; modern methods of care, sanitation, breeding and feed-

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[1] Some extension and change of the work as here outlined will be made in 1909. A revised outline will be sent upon application.

ing. This course will be especially adapted to those who have an amateur interest in live stock, but many of the exercises can be used in the hands of skilful teachers for regular school work. Five exercises weekly for four weeks. Mr. GRIBBEN.

7. PRACTICAL GARDENING. — Practical field exercises in planting, training, cultivation, etc. No special effort will be made to put the work into common school form, but the exercises will be specially valuable to school-garden teachers. Course limited to 20 pupils. Five exercises weekly, two hours each for first four weeks. Mr. TOMPSON.

8. GARDENING INVESTIGATIONS. — Especially designed to develop a new point of view with reference to agriculture and nature study. Each pupil will be put to work in the garden and left to her own resources. So far as possible, no information whatever will be given by the instructor, the endeavor being to answer a great variety of questions through the investigations of the pupils. Suited to advanced teachers. Course limited to 40 pupils. Five exercises weekly, two hours each, for four weeks. Dean WAUGH.

9. TREES AND SHRUBS. — A practical course in arboriculture, covering native and exotic trees and shrubs, their identification, propagation and culture. The work will be largely given in the field. Three exercises weekly for four weeks. Assistant Professor WHITE.

10. FLORICULTURE. — Hardy annual and perennial flowering plants and those cultivated in the house or under glass. Course limited to 15 pupils. Two exercises weekly for four weeks. Assistant Professor WHITE.

11. PLANT LIFE. — Elements of morphology, structure and classification, with special reference to mushrooms and ferns. Five exercises weekly for two weeks, July 20–31. Assistant Professor OSMUN.

12. ELEMENTARY PLANT PHYSIOLOGY. — Simple experiments in plant life with home-made apparatus. Five exercises weekly for first two weeks. Professor STONE.

13. Bird Life. — Given with special reference to the economic relations of birds and the study of nesting habits. Five exercises weekly for the first two weeks of the term.
Professor Dudley.

14. Insect Life. — Given with special reference to the school study of economic insects and modern methods of combating them. Five exercises weekly for the second two weeks of the course.
Professor Fernald.

15. Nature Study Drawing. — For teachers who wish to make greater use of drawing lessons in handling nature study subjects. Course limited to 40 pupils. Five exercises weekly for four weeks.
Mr. Gracey.

16. Forestry. — Forest species, forest composition, regeneration, management, exploitation, etc., with some attention to the economics of forestry, and with special reference to New England conditions. Lectures and field exercises, four exercises weekly for two weeks, August 3–14. Assistant Professor White.

17. The Agricultural Industry in New England. — An outline of the agricultural situation in New England and of the farmers' business problems. Five exercises weekly for last two weeks. Professor Hurd.

18. Agricultural Economics. — A survey of the industry of agriculture as a whole and its relation to other industries; national and world conditions in agriculture. Five times weekly for last two weeks. Professor Carver.

19. The Social Aspect of Agriculture. — Given with special reference to the relation of the country church to the rural problem. Five lectures a week for last two weeks.
President Butterfield.

## Winter School.

### *Purposes and Methods.*

The short winter courses are offered to meet the needs of those, both young and old, who wish to study principles and modern methods in agriculture, and who are unable to attend the four-year courses. The work begins the first Tuesday in January and continues for ten weeks. Students are required to elect courses to make not more than twenty nor less than twelve exercises each week. The arrangement of courses is such that students must follow certain definite lines of work. All elections and all deviations from the rule must be approved by the professor in charge of the winter school. The courses are open to both men and women. Applicants must be eighteen years of age and must furnish satisfactory evidence of good moral character. Attendance upon chapel and the weekly assembly is required. The usual fees are charged for apparatus and materials used in laboratories.

### *Courses of Instruction.*

| | Hours a Week. |
|---|---|
| Soil fertility, | 3 |
| Horticulture, market gardening and fruit growing, | 3 |
| Floriculture, | 5 |
| Forage crops, | 2 |
| Breeds of live stock and animal breeding, | 3 |
| Live-stock feeding and management, | 2 |
| Animal diseases and stable sanitation, | 2 |
| Farm dairying, | 5 |
| Dairy industry, | 8 |
| Dairy bacteriology, | 2 |
| Botany, | 3 |
| Entomology, | 3 |
| Dairy mechanics, | 1 |
| Farm bookkeeping, | 1 |

### *Course in Bee Culture.*

This course will be given, if applied for by at least six students, beginning the fourth Wednesday in May and continuing two weeks. Lectures by specialists will be included. It will include the work outlined in the following summary: —

| | Total Hours. |
|---|---|
| The structure of bees, with special reference to their work,<br>Prof. H. T. Fernald. | 3 |
| Flowers and fruits in their relation to bees,<br>Professor Stone. | 5 |
| Honey crops and how to grow them,<br>Professor Brooks. | 5 |
| Bees and bee-keepers' supplies,<br>Professor Paige. | 10 |
| Work in the apiary, under the direction of an expert, | 20 |

# GENERAL INFORMATION.

# GENERAL INFORMATION.

## A. FINANCIAL AND ADMINISTRATIVE.

### STUDENT EXPENSES.

TUITION. — Tuition is free to citizens of the United States; but students who are citizens of Massachusetts should apply to the senator of the district in which they live for a free scholarship. Blank application forms may be obtained from the registrar. The tuition charged persons not citizens of the United States is $120 a year.

DORMITORIES AND BOARD. — The college has dormitory accommodation for about 64 students. The rooms in the dormitories are occupied chiefly by the upper classmen, hence new students as a rule are obliged to room in private houses. The rooms in the college dormitories are unfurnished. They are arranged in suites of three, — one study room and two bed rooms. They are heated with steam and lighted with electricity. Students care for their rooms themselves. The rent for each person ranges from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $2 a week for each occupant. In Draper Hall (the dining hall) rooms are provided for women students. The rental is $1.50 per week for each person. All correspondence in regard to rooms should be addressed to the dean of the college.

Board can be had at the college dining hall. Good board is furnished at cost. At present the price of board is $3.75 a week, but the college does not promise to keep the price at that figure; it may be more and it may be less.

### EXPENSES.

The necessary college expenses per year are estimated as follows: —

| | Low. | High. |
|---|---|---|
| Tuition: Citizens of Massachusetts free through State scholarships; other citizens of the United States free; foreigners, $120 a year. | | |
| Room in college dormitories or in private houses, . . . . | $39 | $75 |
| Board in college dining hall, $3.75 a week, . . . . . | 135 | 135 |
| Laundry, 50 cents to 85 cents a week, . . . . . . | 18 | 30 |
| Military uniform, first year, . . . . . . . . . | 15 | 15 |
| Laboratory fees, . . . . . . . . . . . | 2 | 20 |
| Books, stationery and other miscellaneous, . . . . . | 16 | 50 |
| | $225 | $325 |

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial demands made upon students which they should expect to meet. Chief among these are class assessments, support for the Musical Association and the Y. M. C. A., and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, college "Signal" (paper), etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is assumed by students joining a fraternity. Students rooming in college dormitories are obliged to equip their rooms with furniture. Besides the amount necessary for clothes, the economical student will probably spend between $250 and $350 a year.

## Student Aid.

Self Help. — A number of students find opportunities for earning money without depending on the labor fund, and many rely upon labor of some sort to earn their way through college. A few men have paid all their way through college; a great many more have paid a large part of their expenses; and many have earned a small proportion of the cost of their course. But the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself at work. The college does not encourage students to enter without money in the expectation of earning their way. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in college, or, instead, to borrow money with which to complete his course. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for labor-fund employment, no one man can receive a large amount from that source.

Labor Fund. — An annual appropriation of $5,000 for student labor is received from the State. This fund is used only in assisting students who are citizens of Massachusetts and dependent entirely or in part on their own exertions. So far as possible such students will be employed in some department of the college. The Department of Agriculture and the Department of Horticulture usually afford the most work. Application for student labor should be made directly to the president. Applicants must present a certificate signed by parent or guardian and by one of the selectmen of the town in which they reside, showing that they need the aid. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor.

Special Notice to Needy Students. — In the last year or two the demand for paid labor on the part of new students has exceeded the amount of employment that the college can offer. The college has, therefore, established a bureau through which it will attempt to find work for new students about the village and on adjacent farms. But it cannot promise work for any students, particularly freshmen. The college accordingly urges prospective students who are dependent upon their own efforts not to undertake the course before they have enough money to carry them through or nearly through the first year.

## Student Accounts.

The following rules are in force concerning student accounts: —

No student will be allowed to graduate until all bills due from him to the institution are paid.

College charges, such as room rent, laboratory fees, tuition, etc., must be paid strictly in advance at the beginning of each semester. No student will be allowed to register until such payments are made.

Every student boarding at Draper Hall shall pay at the beginning of each semester at least one month's board in advance; and no student shall be allowed to continue to board at Draper Hall if more than one month in arrears in his payments.

All money due for student labor shall be applied on account toward any bills that the student may owe to the institution.

### LABORATORY FEES.

| | Per Semester. |
|---|---|
| Botany: — | |
| Graduates, | $4 00 |
| Senior year, | 3 00 |
| Junior year, first semester, | 3 00 |
| Junior year, second semester, | 1 00 |
| Sophomore year, second semester, | 3 00 |
| Chemistry: — | |
| Courses 4, 7, 8, each, | 3 00 |
| Courses 6, 11, 12, 14, 16, 18, each, | 5 00 |
| Deposit for breakage, etc., any course, | 5 00 |
| Entomology: — | |
| Seniors, | 3 00 |
| Landscape gardening: — | |
| Senior year, | 4 00 |
| Junior year, | 2 50 |
| Zoölogy: — | |
| Sophomore year, | 2 00 |
| Other years, | 4 00 |

## B. ACADEMIC AND DEPARTMENTAL.

### DEGREES.

Those who complete the four-years course receive the degree of bachelor of science. Those who receive this degree may also, upon payment of a fee, receive the degree of bachelor of science (B.Sc.) from Boston University (see page 9); but the candidate must meet the conditions imposed by the university concerning preparatory studies. The fee for graduation from the college is $5; that for the degree of Boston University is $10.

Graduate students who complete the assigned courses will receive the degree of master of science (M.Sc.) (fee, $10). Credit may sometimes be allowed toward this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study and present a satisfactory thesis will be granted the degree of doctor of philosophy (fee, $25).

Those to whom degrees are awarded must present themselves in person at commencement to receive them. Honorary degrees are not conferred.

## SCHOLARSHIPS AND PRIZES.

### *Scholarships.*

The income of gifts from different persons is distributed in scholarships to worthy students requiring aid. The funds supporting these scholarships are: —

1. The Mary Robinson fund of $1,000, the bequest of Miss Mary Robinson of Medfield.

2. The Whiting Street fund of $1,000, the bequest of Whiting Street of Northampton.

3. The Henry Gassett fund of $1,000, the bequest of Henry Gassett of North Weymouth.

### *Prizes.*

Prizes are given annually in several departments for excellence in study or for special achievement. The prizes offered for 1909 are: —

AGRICULTURE. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

BOTANY. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1909, a prize of $5 is offered to that member of the freshman class who presents the best herbarium of native flowering plants.

ENGLISH. — The Flint prizes (first, $30; second, $20) are awarded under certain restrictions to those members of the junior class delivering the best and the second best oration. Both composition and delivery are considered.

The Burnham prizes in English, given by the late T. O. H. P. Burnham of Boston, are awarded as follows: To freshmen, for excellence in declamation, two prizes: first, $25; second, $20. The speakers are chosen through a series of competitions.

ENTOMOLOGY. — Professional entomologists among the alumni of the college offer two prizes for the best work done in entomology by undergraduates. The prizes ($20 and $10) are awarded by the

Department of Entomology according to a scale of points announced in advance.

Forestry. — The J. W. D. French prize ($25) is given by the Bay State Agricultural Society to that member of the senior class who writes the best essay on forestry.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character, and example.

### *Winter Course Prizes for 1909.*

1. Given by the Bowker Fertilizer Company, Boston, to the student who is most familiar with the nature and composition of fertilizers and their use, one-half ton Stockbridge fertilizer.

2. Given by the German Kali Works, New York City, for the best essay on the use of fertilizers with particular reference to the use of potash, one ton of kainit or its value in gold.

### *Military Diplomas.*

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the Department of Military Science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

## EQUIPMENT.

Agronomy. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a good surveyor's transit, a wye level and two drainage levels, rods, steel tapes, surveyors' pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

ANIMAL HUSBANDRY. — An important part of the equipment for laboratory work in animal husbandry is the live stock of the college farm, which includes pure-bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach, Percheron and Clydesdale horses, and Berkshire and Yorkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 85 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

CHEMISTRY. — The department of chemistry has rooms adapted to chemical uses, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 70 students. Immediately adjoining it are four smaller rooms for apparatus and the preparation of materials for the lecture table. The laboratory for beginners is furnished with 40 working-tables. Each table is provided with reagents and apparatus for independent work. A well-equipped laboratory for advanced work is also provided. The weighing room has 6 balances and improved apparatus for determining densities of solids, liquids and gases. The equipment includes also a microscope, a spectroscope, a polariscope, a photometer, a barometer, numerous models, and an extensive collection of industrial charts, and there is a valuable and growing collection of specimens and samples. The latter includes rocks, minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds. With this should also be mentioned a series of preparations used for illustrating the various stages of different manufactures, from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. It contains a number of suites of rooms reserved for women students. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *Entomological Laboratory.* — The equipment for work in entomology for seniors and for graduate students is unusually good. The laboratory building contains a large room for laboratory work, provided with tables, dissecting and compound microscopes, microtomes, reagents and the usual laboratory implements. One part of the building is fitted up as a lecture room. Another part is devoted to library purposes, and contains a card catalogue of more than 50,000 cards, indexing the literature on insects. Besides the well-selected list of entomological works in this room, there are in the college library an unusual number of rare and valuable books on this subject. These libraries are supplemented by the private libraries of the professors in charge, which contain more than 25,000 volumes, many of which cannot be found elsewhere in the United States. In another room is a large and growing collection of insects, both in the adult and in the early stages. As the laboratory is associated with the insectary of the college experiment station, the facilities of the latter are directly available. The apparatus room of the insectary, with its samples of spray pumps, nozzles and other articles for the practical treatment of insects; the chemical room, fitted for the analysis of insecticides and for other chemico-entomological work; and a greenhouse where plants infected with injurious insects are under continual observation and experimental treatment, are all open to the student; and in addition are provided several private laboratory rooms and a photographing room with an unusually good equipment of cameras. The large greenhouses, grounds, gardens and orchards of the college provide further for study under natural conditions of a wide range of subjects relating to injurious insects.

FARM ADMINISTRATION. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

FLORICULTURE. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of arboriculture.

GEOLOGY. — The teaching in geology is illustrated with a very complete series of minerals, the State collection of rocks of Massachusetts, a series of Ward's fossils and casts of fossils, and models and charts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-years course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for exacting work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library occupies the lower floor of the Library-Chapel building. It contains nearly 32,000 books. Among these. scientific treatises predominate, but history, economics and literature are well represented. Indeed, the library has grown so rapidly that additional room has become necessary. The reading room supplies good periodicals, both technical and non-technical; encyclopedias and general reference books; and a selected collection of works for general reading.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS, PHYSICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 2 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

*Physics.* — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, a recitation room, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium is to be fitted with a model bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

POMOLOGY. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1908–09, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey, and Vermont, besides collections of grapes from California and citrous fruits from Florida and Texas.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, both built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

ZOÖLOGY. — A large and well-lighted room in the South College is equipped as a zoölogical laboratory. It has the best apparatus, consisting of microscopes, both simple and compound, a microtome, a paraffin bath, an incubator, dissecting instruments and other necessary apparatus. A reference library which includes the current zoölogical and geological journals is kept in this room, and there are ample aquaria in which living aquatic forms may be studied.

The lecture room is a large room in South College. It is supplied with an electric projection lantern, a set of Leuckart charts, various special charts and a complete set of Auzoux models illustrative of human and comparative anatomy. A special set of topical specimens is used for class illustration, and the more extensive museum collection is drawn upon for the same purpose.

The museum is relied on mainly for specimens illustrating the forms treated of in the lecture and the laboratory courses. In addition to this, the aim has been to show as fully as possible the fauna of Massachusetts, and types that show especially the evolution and the relationship of the members of the animal kingdom. The collection consists of more than 11,000 specimens. The museum is open to the public on Saturdays from 1 to 5 P.M. and on other week days from 2.15 to 4.15 P.M. The curator is Assistant Professor Gordon.

## College Activities.

### *Religious Services.*

Chapel services are held four mornings a week. On Wednesday, instead of chapel an afternoon assembly is held, for which an attempt is made to secure speakers who will present important current subjects. Students are required to attend chapel and assembly.

The Young Men's Christian Association of the college holds a short religious meeting in the chapel on Thursday evenings, and conducts several Bible classes. For part of the year the college and the Y. M. C. A. unite in Sunday vespers, held in the chapel. At vespers a prominent clergyman or layman speaks.

### *Student Organizations.*

A large number of student organizations furnish opportunity for work and leadership to students.

The Massachusetts Agricultural College Social Union has recently been established. All students become members by paying a small fee; the Union is designed to become the center of student interests. It has equipped in North College a trophy room and a large lounging room for music, games, reading and study; and in the fall and winter months it gives a series of entertainments, free to the students and faculty.

The Young Men's Christian Association is active both socially and religiously.

The College Senate is composed of representatives of the senior and junior classes. It serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The musical organizations include an orchestra, a glee club and a quartette. These furnish music for college meetings, and occasionally give concerts. A military band is maintained as part of the cadet corps.

The Athletic Association represents in the college the interests of the football, baseball, basketball, track, hockey and tennis teams.

Among the other clubs are the Mettewampe Club, organized for walking and other outdoor recreation, and a debating club.

The college publications are the "Signal," published bi-weekly by the student body, and the "Index," published annually by the junior class.

### *Clubs, Conferences and Seminars.*

The College Chemical Club is designed to bring the students of chemistry into closer relationship. Original papers are often read by the members, seminars are held, and outside speakers are invited to address the club and to discuss with the members general topics pertaining to chemistry.

The Stockbridge Club is an organization of students specially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

The English Conference, meeting once a month or oftener, is composed of the instructors in the department of English and the students who are enrolled in elective English.

A seminar for juniors and seniors is conducted by the division of agriculture. The division of horticulture likewise conducts conferences or seminars.

An entomological club and a zoölogical club are also maintained by those specially interested in these departments of college work.

## HONORS AND AWARDS — 1908.

### *Prize Awards.*

THE GRINNELL AGRICULTURAL PRIZE. — To those members of the senior class who produce the best and second best examinations, oral and written, in theoretical agriculture. First prize, $40, to John Daniel; second prize, $20, to Clifford Dolan.

J. W. D. FRENCH PRIZE IN ARBORICULTURE. — To the writer of the best essay on the street trees of Amherst. One prize, $25, to Charles S. Putnam.

HILLS BOTANICAL PRIZES. — For the best general herbarium, $15, to Laruentsius D. Larsen. For the best collection of Massachusetts trees and shrubs, $10, to Stearnes L. Davenport. For the best collection of Massachusetts woods, $10, to Winthrop A. Cummings.

BURNHAM PRIZES IN ENGLISH. — To freshmen, for excellence in public declamation: first prize, $25, to Allyn P. Bursley; second prize, $20, to Herbert J. Baker; honorable mention, Herbert W. Blaney. To sophomores, for excellence in competitive essay writing: first prize, $20, no award; second prize, $10, to Henry T. Cowles; third prize, $5, to Samuel W. Mendum.

FLINT PRIZES IN ENGLISH. — To members of the junior class who produce the best and second best orations: first prize, $30, to Richard C. Potter; second prize, $20, to Charles H. White; honorable mention, Marcus T. Smulyan.

ENTOMOLOGICAL PRIZE. — Given by graduates of the college working in entomology to the two members of the senior class taking that subject who have most fully satisfied certain requirements of work indicated by the donors. First prize, $20, to Carlton C. Gowdey; second prize, $10, to James A. Hyslop.

THE WESTERN ALUMNI ASSOCIATION PRIZE. — To that member of the sophomore class who, during his two years in college, has shown the greatest improvement in scholarship, character and example. $25, to Frank T. Haynes.

### *Military Honors.*

The following cadets, members of the senior class, were reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts as showing special aptitude for military service: John Albert Anderson, Chester Socrates Gillett, Kenneth Edward Gillett, Edwin Daniels Philbrick, William Franklin Turner, Roland Hale Verbeck, Hermon Temple Wheeler, Raymond Dean Whitmarsh, Samuel Judd Wright.

# DEGREES CONFERRED AND ROLL OF STUDENTS.

# Degrees Conferred—1908.

## Doctor of Philosophy.

Franklin, Henry James, Bernardston. B.S., Massachusetts Agricultural College, 1903.

## Master of Science.

Shaw, Jacob Kingsley, North Amherst. B.S., University of Vermont, 1899.

Total, 2.

## Bachelor of Science (B.Sc.).

| | |
|---|---|
| Allen, Charles Francis, | Worcester. |
| Alley, Harold Edward, | Gloucester. |
| Anderson, John Albert, | North Brookfield. |
| Anderson, Kenneth French, | Roslindale. |
| Bailey, Ernest Winfield, | Worcester. |
| Bangs, Bradley Wheelock, | Amherst. |
| Barry, Thomas Addis, | Amherst. |
| Bartholomew, Persis, | Melrose Highlands. |
| Bates, Carleton, | Salem. |
| Chapman, Lloyd Warren, | Pepperell. |
| Chase, Henry Clinton, | Swampscott. |
| Clark, Orton Loring, | Malden. |
| Cobb, George Robert, | Amherst. |
| Coleman, William John, | Natick. |
| Cummings, Winthrop Atherton, | Bondsville. |
| Cutting, Leroy Edward, | Amherst. |
| Daniel, John, | Osterville. |
| Davenport, Stearnes Lothrop, | North Grafton. |
| Davis, Paul Augustin, | Lowell. |
| Dolan, Clifford, | Hudson. |
| Eastman, Perley Monroe, | Townsend. |
| Edwards, Frank Laurence, | Somerville. |
| Farley, Arthur James, | Waltham. |
| Farrar, Parke Warren, | Springfield. |
| Flint, Clifton Leroy, | Amesbury. |
| Gillett, Chester Socrates, | Southwick. |
| Gillett, Kenneth Edward, | Southwick. |
| Gowdey, Carlton Craig, | *Bridgetown, Barbados.* |
| Hayes, Herbert Kendall, | *North Granby, Conn.* |

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|---|---|
| Howe, William Llewellyn, | Marlborough. |
| Hutchings, Frank Farley, | Amherst. |
| Hyslop, James Augustus, | *Rutherford, N. J.* |
| Jackson, Raymond Hobart, | Amherst. |
| Jennison, Harry Milliken, | Millbury. |
| Johnson, Frederick Andrew, | Westford. |
| Jones, Thomas Henry, | Easton. |
| Larned, Adelbert Joseph, | Amherst. |
| Larsen, Lars David, | *Bridgeport, Conn.* |
| Liang, Lai-Kwei, | *Tientsin, China.* |
| Miller, Danforth Parker, | Worcester. |
| Paige, George, | Amherst. |
| Parker, John Robert, | *Poquonock, Conn.* |
| Philbrick, Edwin Daniels, | Somerville. |
| Reed, Horace Bigelow, | Worcester. |
| Regan, William Swift, | Northampton. |
| Sawyer, William Francis, | Sterling. |
| Shattuck, Leroy Altus, | Pepperell. |
| Thurston, Frank Eugene, | Worcester. |
| Turner, Olive May, | Amherst. |
| Turner, William Franklin, | Reading. |
| Verbeck, Roland Hale, | Malden. |
| Warner, Theoren Levi, | Sunderland. |
| Waugh, Thomas Francis, | Worcester. |
| Wellington, Joseph Worcester, | Waltham. |
| Wheeler, Hermon Temple, | Lincoln. |
| Whiting, Albert Lemuel, | Stoughton. |
| Whitmarsh, Raymond Dean, | Amherst. |
| Wright, Samuel Judd, | South Sudbury. |

Total, 58.

# ROLL OF STUDENTS.

### GRADUATE STUDENTS. — CANDIDATES FOR A DEGREE.

| | | |
|---|---|---|
| Bouquet, Arthur George Bristol,<br>B.S., Oregon Agricultural College, 1906. | *Purley, Eng.,* | 9 Fearing Street. |
| Bourne, Arthur Israel,<br>A.B., Dartmouth College, 1907. | *Kensington, N. H.,* | 82 Pleasant Street. |
| Burrell, Orange Bennett,<br>B.S., Michigan Agricultural College, 1905. | *South Haven, Mich.,* | – – |
| Chapman, George Henry,<br>B.Sc., Massachusetts Agricultural College, 1907. | *Wallingford, Conn.,* | 15 Amity Street. |
| Davis, Irving Gilman,<br>A.B., Bates College, 1906. | *Auburn, Me.,* | 24 North College. |
| Holland, Edward Bertram,<br>M.Sc., Massachusetts Agricultural College, 1898. | Amherst, | 28 North Prospect Street. |
| Hooker, Charles Worcester,<br>A.B., Amherst College, 1906. | Amherst, | 5 North East Street. |
| Jennison, Harry Milliken,<br>B.Sc., Massachusetts Agricultural College, 1908. | Auburn, | 66 Pleasant Street. |
| Johnson, Frederick Andrew,<br>B.Sc., Massachusetts Agricultural College, 1908. | Graniteville, | 84 Pleasant Street. |
| Regan, William Swift,<br>B.Sc., Massachusetts Agricultural College, 1908. | Northampton, | 84 Pleasant Street. |
| Smith, Philip Henry,<br>B.Sc., Massachusetts Agricultural College, 1897. | Amherst, | 102 Main Street |
| Summers, John Nicholas,<br>B.Sc., Massachusetts Agricultural College, 1907. | Campello, | Insectary. |
| Thurston, Frank Eugene,<br>B.Sc., Massachusetts Agricultural College, 1908. | Worcester, | 66 Pleasant Street. |
| Whitmarsh, Raymond Dean,<br>B.Sc., Massachusetts Agricultural College, 1908. | Amherst, | 120 Pleasant Street. |

Total, 14.

### SPECIAL STUDENTS. — NOT CANDIDATES FOR A DEGREE.

| | | |
|---|---|---|
| Nagai, Isaburo, | *Tokyo, Japan,* | 120 Pleasant Street. |

Total, 1.

### SENIOR CLASS.

| | | |
|---|---|---|
| Alger, Paul Edgar, | Reading, | Brooks Farm. |
| Barlow, Waldo Darius,[1] | Amherst, | 7 Northampton Road. |
| Barnes, Benjamin Franklin, Jr., | Haverhill, | Theta Phi House. |
| Bartlett, Oscar Christopher, | Westhampton, | Mr. Goldberg's. |
| Briggs, Orwell Burlton,[1] | Egremont, | 82 Pleasant Street. |
| Brown, George Murray, Jr., | Cambridge, | 4 South College. |
| Caffrey, Donald John,[1] | Gardner, | West Experiment Station. |
| Cardin, Patricio Pennaradonda, | *Artemesia, Cuba,* | 7 South College. |
| Chase, Edward Irving,[1] | Somerville, | 30 North Prospect Street. |
| Codding, George Melvin, | Taunton, | 17 South College. |
| Corbett, Lamert Seymour, | Jamaica Plain, | 6 South College. |
| Crosby, Harold Parsons, | Lenox, | 12 South College. |
| Crossman, Samuel Sutton, | Needham, | 11 South College. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Curran, David Aloysius, | Marlborough, | North Pleasant Street. |
| Cutler, Homer, | Westborough, | West Experiment Station. |
| Fulton, Gordon Russell,[1] | Lynn, | West Experiment Station. |
| Geer, Myron Francis, | Springfield, | 44 Pleasant Street. |
| Geer, Wayne Emory,[1] | Springfield, | 44 Pleasant Street. |
| Hathaway, Elmer Francis, | Cambridge, | Kappa Sigma House. |
| Hsieh, En-Lung, | *Tientsin, China,* | 6 Maple Street. |
| Hubbard, Arthur Ward, | Sunderland, | 5 South College. |
| Ide, Warren Leroy, | Dudley, | 9 North College. |
| Ingalls, Dorsey Fisher, | Cheshire, | 5 South College. |
| Jen, Huan, | *Tientsin, China,* | 31 East Pleasant Street. |
| Knight, Harry Orrison, | Gardner, | 96 Pleasant Street. |
| Lindblad, Rockwood Chester, | North Grafton, | 20 South College. |
| Lull, Robert Delano,[1] | *Windsor, Vt.,* | – – |
| MacGown, Guy Ernestus, | *South Britain, Conn.,* | West Experiment Station. |
| Monahan, James Valentine, | South Framingham, | East Pleasant Street. |
| Neale, Harold Johnson, | Worcester, | 9 South College. |
| Noble, Harold Gordon, | Springfield, | 20 South College. |
| Noyes, John, | Roslindale, | Wilder Hall. |
| O'Grady, James Raphael, | Holliston, | 8 South College. |
| Oliver, John Thomas, | Dorchester, | 14 Kellogg Avenue. |
| Phelps, Harold Dwight, | West Springfield, | Plant House. |
| Potter, Richard Chute, | Concord, | 11 South College. |
| Putnam, Charles Sumner, | Princeton, | 13 East Pleasant Street. |
| Sexton, George Francis, | Worcester, | Walker's House. |
| Smulyan, Marcus Thomas, | *New York, N. Y.,* | West Experiment Station. |
| Thompson, Myron Wood, | Halifax, | 18 South College. |
| Thomson, Jared Brewer, | Monterey, | 25 North College. |
| Turner, Henry William,[1] | *Trinidad, Cuba,* | 9 South College. |
| Warner, Frederick Chester, | Sunderland, | 6 South College. |
| Waters, Theodore Charles, | *Rocky Hill, Conn.,* | French Hall. |
| Webb, Charles Russell, | Worcester, | 10 South College. |
| Whaley, James Sidney, | *East Orange, N. J.,* | 12 East Pleasant Street. |
| White, Charles Howard,[1] | *Providence, R. I.,* | 4 South College. |
| White, Herbert Linwood, | *Evansville, Ind.,* | Cutler's House. |
| Willis, Luther George,[1] | Melrose Highlands, | Mr. Walsh's. |
| Wilson, Frank Herbert, Jr., | Nahant, | 12 South College |

Total, 50.

### Junior Class.

| | | |
|---|---|---|
| Allen, Rodolphus Harold,[1] | Fall River, | Kappa Sigma House. |
| Annis, Ross Evered,[1] | Natick, | 116 Pleasant Street. |
| Armstrong, Robert Pierson,[1] | *Rutherford, N. J.,* | 26 North College. |
| Bailey, Dexter Edward, | Tewksbury, | 88 Pleasant Street. |
| Bailey, Justus Conant, | Wareham, | 88 Pleasant Street. |
| Beeman, Francis Stone, | Amherst, | 86 Main Street. |
| Blaney, Jonathan Phillips,[1] | Swampscott, | 22 North College. |
| Brandt, Louis, | Everett, | Clark Hall. |
| Brooks, Henry Alvan, | *Cleveland, O.,* | 16 South College. |
| Brooks, Sumner Cushing, | Amherst, | Plant House Ground. |
| Brown, Louis Carmel, | Bridgewater, | 28 North College. |
| Burke, Edward Joseph,[1] | Holyoke, | 9 South College. |
| Clarke, Walter Roe, | *Milton-on-Hudson, N. Y.,* | 1 South College. |
| Cloues, William Arthur,[1] | *Warner, N. H.,* | 7 South College. |
| Cowles, Henry Trask, | Worcester, | 88 Pleasant Street. |
| Damon, Edward Farnham,[1] | Concord Junction, | 18 South College. |
| Dickinson, Lawrence S., | Amherst, | Plant House Grounds. |
| Eddy, Roger Sherman, | Dorchester, | 116 Pleasant Street. |
| Everson, John Nelson, | Hanover, | 2 South College. |
| Fisk, Raymond John, | Stoneham, | 88 Pleasant Street. |
| Folsom, Josiah Chase, | Billerica, | College Store. |
| Francis, Henry Russell,[1] | Dennisport, | 10 North College. |

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[1] Work incomplete.

| | | |
|---|---|---|
| French, Horace Wells, | *Pawtucket, R. I.,* | 15 South College. |
| Haynes, Frank Tuttle, | Sturbridge, | 28 North College. |
| Hazen, Myron Smith, | Springfield, | Veterinary Laboratory. |
| Holland, Arthur Witt, | Shrewsbury, | 24 North College. |
| Hosmer, Charles Irwin, | Turners Falls, | 8 South College. |
| Johnson, William Clarence, | South Framingham, | 10 North College. |
| Leonard, William Edward,[1] | Belmont, | 22 North College. |
| McLaine, Leonard Septimus, | *New York, N. Y.,* | 1 South College. |
| Mendum, Samuel Weis, | Roxbury, | 88 Pleasant Street. |
| Nickless, Fred Parker,[1] | Billerica, | College Store. |
| Oertel, Charles Andrew, | South Hadley Falls, | South Hadley Falls. |
| Partridge, Frank Herbert, | Cambridge, | Clark Hall. |
| Paulsen, George,[1] | *New York, N. Y.,* | 2 South College. |
| Prouty, Frank Alvin,[1] | Worcester, | Snell Street. |
| Rockwood, Albert Fletcher,[1] | Concord, | 17 South College. |
| Roy, Goldie Calista,[1] | Watertown, | 97 Pleasant Street. |
| Schermerhorn, Lyman Gibbs,[1] | *Kingston, R. I.,* | 5 North College. |
| Shamiæ, George Mansour, | *Damascus, Syria,* | Old Creamery. |
| Thomas, Frank Lincoln, | Athol, | 21 North College. |
| Titus, Willard McCready,[1] | New Braintree, | 16 South College. |
| Turner, Edward Harrison,[1] | Reading, | Plant House. |
| Urban, Otto Velorous Taft, | Upton, | Kappa Sigma House. |
| Vinton, George Newton,[1] | Sturbridge, | Thompson House. |
| Waldron, Ralph Augustus,[1] | Hyde Park, | East Experiment Station. |
| Wallace, William Newton,[1] | Amherst, | 6 Phillips Street. |
| | Total, 47. | |

### Sophomore Class.

| | | |
|---|---|---|
| Adams, James Fowler,[1] | Melrose, | 5 North College. |
| Allen, Park West, | Westfield, | 14 South College. |
| Armstrong, Ralph Henry,[1] | Holyoke, | 75 Pleasant Street. |
| Baker, Herbert Jonathan, | *Selbyville, Del.,* | Kappa Sigma House. |
| Barrows, Raymond Corbin, | *Stafford Springs, Conn.,* | E. H. Forristall. |
| Bean, Thomas Webster, | South Hadley Falls, | South Hadley Falls. |
| Bentley, Arnold Gordon, | Hyde Park, | 3 McClellan Street. |
| Blaney, Herbert Wardwell, | Swampscott, | 87 Pleasant Street. |
| Brown, Edgar Morton, | Springfield, | 9 North College. |
| Brown, Irving Clarence, | Natick, | 96 Pleasant Street. |
| Burnham, Arthur James, | Holyoke, | 75 Pleasant Street. |
| Burseley, Allyn Parker, | West Barnstable, | 88 Pleasant Street. |
| Conant, Arthur Theodore, | Sunderland, | Sunderland, |
| Damon, Charles Murray, | Haydenville, | Experiment Station. |
| Davis, Egbert Norton, | South Framingham, | 77 Pleasant Street. |
| Davis, Irving Wilder, | Lowell, | Insectary. |
| Drury, Harold Blake, | Athol, | 23 North College. |
| Dudley, John Edward,[1] | Newton Center, | 21 North College. |
| Gilgore, Irvin Craig, | *Schenectady, N. Y.,* | 3 McClellan Street. |
| Henry, Willard Francis, | Hopedale, | 7 North College. |
| Hill, Nathaniel Herbert, | *Glenmoore, N. J.,* | 14 South College. |
| Howe, Harold Hosmer,[1] | Springfield, | Kappa Sigma House. |
| Huang, Chen-Hua, | *Tientsin, China,* | 75 Pleasant Street. |
| Jenks, Albert Roscoe, | Three Rivers, | Plant House. |
| Johnson, Leonard Matthews, | Easthampton, | 27 North College. |
| Labouteley, Gaston Edward, | Lynn, | Kappa Sigma House. |
| Larrabee, Edward Arthur, | Winthrop, | Clark Hall. |
| Lodge, Charles Albert,[1] | Manchester, | 87 Pleasant Street. |
| McLaughlin, Frederick Adams,[1] | Lee, | Kappa Sigma House. |
| McNayr, Rupert Stanley, | Rockland, | 13 South College. |
| McGraw, Frank Dobson, | Fall River, | North College. |
| Morse, Henry Bowditch, | Salem, | Kappa Sigma House. |
| Nielsen, Gustaf Arnold,[1] | West Newton, | 96 Pleasant Street. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Nickerson, George Payne, | Amherst, | East Experiment Station. |
| Ostrolenk, Bernhard, | *Gloversville, N. Y.*, | 23 North College. |
| Parsons, Samuel Reynolds, | North Amherst, | North Amherst. |
| Patch, Roland Harrison, | Wenham, | 88 Pleasant Street. |
| Pauly, Herman Alfred, | Somerville, | Nash Hall. |
| Pickard, Percy William, | Hopedale, | 7 North College. |
| Piper, Ralph Waldo, | South Acton, | 116 Pleasant Street. |
| Prouty, Philip Herman, | Shrewsbury, | 27 North College. |
| Racicot, Philias Armand,[1] | Lowell, | South College. |
| Robinson, Ralph Cushing, | Boston, | 9 Fearing Street. |
| Sharpe, Arthur Harris, | Saxonville, | Kappa Sigma House. |
| Smith, Clarence Albert, | Northampton, | Forristall's. |
| Smith, Raymond Goodale,[1] | Lynn, | 3 Fearing Street. |
| Stevenson, Lomas Oswald, | *Hackensack, N. J.*, | 87 Pleasant Street. |
| Warren, Edward Irving,[1] | Leicester, | 82 Pleasant Street. |
| Whitney, Raymond Lee, | Brockton, | 21 North College. |
| Willard, Harold Francis, | Leominster, | 44 Pleasant Street, |
| Winn, Ervin Lawrence,[1] | Holden, | 96 Pleasant Street. |

Total, 54.

### Freshman Class.

| | | |
|---|---|---|
| Ackerman, Arthur John, | Worcester, | 82 Pleasant Street. |
| Baird, Everett Jamieson, | Clinton, | 19 Fearing Street. |
| Beers, Rowland Trowbridge, | Billerica, | Experiment Station. |
| Bent, William Richard, | Marlborough, | Brooks Farm. |
| Birdsall, Webster Jennings, | *Otego, N. Y.*, | 58 Pleasant Street. |
| Bodfish, Edward Hill, | West Barnstable, | 6 Allen Street. |
| Boland, Eric Nicholas, | South Boston, | 9 Fearing Street. |
| Brett, Alden Charles, | North Abington, | Prof. W. P. Brook's. |
| Brown, Merle Raymond, | Greenwich Village, | 60 College Street. |
| Burr, Frederick Huntington, | Worthington, | Fearing Street (Miss Sargent's). |
| Cabot, George Dwight, | Winchester, | 79 Pleasant Street. |
| Caldwell, Lawrence Sanborn, | Lynn, | 3 McClellan Street. |
| Campbell, Clare Avery, | Boston, | 8 Kellogg Aveune. |
| Carpenter, Jesse, Jr., | Attleborough, | Kappa Sigma House. |
| Castle, Fred Arlo, | *Kansas City, Mo.*, | 116 Pleasant Street. |
| Clapp, Raymond Kingsley, | Westhampton, | Mr. E. H. Forristall's. |
| Cohen, Harold, | Somerville, | 96 Pleasant Street. |
| Covill, Joseph Warren, | West Roxbury, | 9 Fearing Street. |
| Curran, Daniel Joseph, | Marlborough, | East Pleasant Street. |
| Daniel, Edward Stephen Coen, | Osterville, | 6 Allen Street. |
| Dee, John Francis, | Worcester, | 75 Pleasant Street. |
| Deming, Winfred Griswold, | *Wethersfield, Conn.*, | 75 Pleasant Street. |
| Dodge, Albert Wesley, | Wenham, | Mr. Walker's. |
| Durling, Edgar Vincent, | *Brooklyn, N. Y.*, | 60 Pleasant Street. |
| Eastman, Edward Baxter, Jr., | North Amherst, | Leverett Street. |
| Eisenhaure, John Louis, | North Reading, | Thompson House. |
| Ells, Gordon Waterman, | Cambridge, | 44 Triangle Street. |
| Fagerstrom, Leon Emanuel, | Worcester, | 82 Pleasant Street. |
| Finnegan, John Thomas, | Forest Hills, | 66 Pleasant Street. |
| Fisherdick, Warren Francis, | Amherst, | 26 South Pleasant Street. |
| Fitts, Frank Orus, | North Amherst, | North Amherst. |
| Fitzgerald, John Joseph, | Holyoke, | 96 Pleasant Street. |
| Folger, Ernest Maynard, | Brockton, | 17 Fearing Street. |
| Fowler, George Scott, | Wayland, | 44 Pleasant Street. |
| Frost, John Newton, | Natick, | 77 Pleasant Street. |
| Gallagher, James Andrew, | North Wilmington, | 44 Triangle Street. |
| Gaskill, Lewis Warren, | Hopedale, | Mr. Goldberg's. |
| Gelinas, Louis Edmund, | North Adams, | Brooks Farm. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Gibbs, Robert Morey, | Chester, | Brooks Farm. |
| Gibson, Lester Earle, | Melrose, | 44 Triangle Street. |
| Gray, Frank Leonard, | East Boston, | 19 Fearing Street. |
| Hall, Ralph Sawyer, | Sturbridge, | 82 Pleasant Street. |
| Hamilton, Percy, | *Portland, Me.*, | 5 McClellan Street. |
| Harlow, Joseph Alvin, | Turners Falls, | 75 Pleasant Street. |
| Heald, Jay Morrill, | Watertown, | 3 McClellan Street. |
| Hemenway, Thomas, | Winchester, | 79 Pleasant Street. |
| Hills, Frank Burrows, | Bernardston, | 77 Pleasant Street. |
| Hickey, Francis Benedict, | Brockton, | 5 McClellan Street. |
| Holland, Henry Lucius, | Amherst, | 28 North Prospect Street. |
| Hutchings, Herbert Colby, | South Amherst, | Mr. E. H. Forristall's. |
| Kingsbury, Arthur French, | Medfield, | Mr. E. H. Forristall's. |
| Lamson, Robert Ward, | Amherst, | 109 Main Street. |
| Lloyd, Edward Russell, | Boston, | 6 Phillips Street. |
| Lowry, Quincy Shaw, | Canton, | 120 Pleasant Street. |
| Lundgren, Arthur Robert, | Orange, | 88 Pleasant Street. |
| Martin, James Francis, | Amherst, | 19 South East Street. |
| Maxon, Donald Charles, | *Elkhart, Ind.*, | 25 Sunset Avenue. |
| McGarr, Thomas Anthony, | Worcester, | 31 East Pleasant Street. |
| McLean, John Robert, | Medford, | 60 Pleasant Street. |
| Merkle, George Edward, | Amherst, | East Street. |
| Merrill, Fred Sawyer, | Danvers, | 96 Pleasant Street. |
| Messer, Allen Irving, | Pittsfield, | – – |
| Moreau, Theodore Joseph, | Turners Falls, | 75 Pleasant Street. |
| Mueller, Alfred Frederick, | Jamaica Plain, | 5 Fearing Street. |
| Norris, Edward Jaffray, | Somerville, | 96 Pleasant Street. |
| Noyes, Harry Alfred, | Marlborough, | 120 Pleasant Street. |
| O'Flynn, George Bernard, | Worcester, | 75 Pleasant Street. |
| Oppel, Eugene Irving, | *Little Falls, N. Y.*, | 82 Pleasant Street. |
| Parker, Ralph Robinson, | Malden, | 27 North College. |
| Pearson, Charles Cornish, | Arlington, | 96 Pleasant Street. |
| Peckham, Curtis, | Clifford, | 5 Fearing Street. |
| Philbrick, William Edwin, | Taunton, | 96 Pleasant Street. |
| Pierpont, John Edwards, | Williamsburg, | 79 Pleasant Street. |
| Pratt, Marshall Cotting, | Lowell, | 120 Pleasant Street. |
| Puffer, Stephen Perry, | North Amherst, | North Amherst. |
| Raymond, Arthur Nathaniel, | Leominster, | 120 Pleasant Street. |
| Reed, Robert Edward, | Abington, | 88 Pleasant Street. |
| Roberts, Clarence Dwight, | *New Haven, Conn.*, | 82 Pleasant Street. |
| Robinson, Earle Johnson, | Hingham, | 116 Pleasant Street. |
| Rockwood, Lawrence Peck, | *Waterbury, Conn.*, | 116 Pleasant Street. |
| Sanctuary, William Crocker, | Amherst, | 147 South Pleasant Street. |
| Sellew, Lewis Raymond, | Natick, | 77 Pleasant Street. |
| Shaw, Ezra Ingram, | Amherst, | 8 Spaulding Street. |
| Smith, Harrison Edward, | Medford, | 27 North College. |
| Southwick, Benjamin Gilbert, | Buckland, | 82 Pleasant Street. |
| Springer, Isaac, | Boston, | 5 Fearing Street. |
| Stack, Herbert James, | Amherst, | East Pleasant Street. |
| Tong, Ying Hee, | *Tientsin, China*, | – – |
| Torrey, Ray Ethan, | North Leverett, | East Pleasant Street. |
| Tower, Daniel Gordon, | Roxbury, | 79 Pleasant Street. |
| Tucker, John William, | Worcester, | Brooks Farm. |
| Tupper, George Wilbur, | Roxbury, | 96 Pleasant Street. |
| Turner, Austin Ralph, | Walpole, | 75 Pleasant Street. |
| Turner, Howard Archibald, | Dorchester, | East Pleasant Street and Lover's Lane. |
| Wales, Robert Webster, | North Abington, | Brooks Farm. |
| Walker, Herman Chester, | Marlborough, | Brooks Farm. |
| Warner, Roger Andrew, | Sunderland, | Mr. E. H. Forristall's. |
| Weaver, William Jack, | Alandar, | 6 Allen Street. |
| Whitney, Charles Edward, | Wakefield, | Brooks Farm. |
| Wilbur, Emory Sherman, | East Wareham, | 101 Pleasant Street. |
| Wilde, Earle Irving, | Taunton, | Kappa Sigma House. |

| | | |
|---|---|---|
| Williams, Edward Roger, | Concord Junction, | 116 Pleasant Street. |
| Williams, Silas, | Fall River, | Mr. R. J. Goldberg's. |
| Wood, Howard Holmes, | Shelburne Falls, | 10 Allen Street, |
| Young, Edward Burnham, | Dorchester, | 8 Kellogg Avenue. |

Total, 116.

## WINTER COURSE STUDENTS — 1909.

| | |
|---|---|
| Adams, Alpheus Rufus, | Northborough. |
| Adams, Arthur Simonds, | Shrewsbury. |
| Adams, Fred Carlton, | Amherst. |
| Aldrich, Leon Henry, | Belchertown. |
| Allen, James Beatty, | Haverhill. |
| Allen, Ralph Owen, | West Brookfield. |
| Avery, Lester Ellsworth, | Plymouth. |
| Badger, Ralph Alvin, | *Randolph, Vt.* |
| Barstow, Harold Dunbar, | South Hadley. |
| Bayer, Harry, | *New York, N. Y.* |
| Beaubien, Arthur, | Turners Falls. |
| Belches, Edward Faxon, | South Framingham. |
| Bibber, John Carleton, | *Freeport, Me.* |
| Bodette, Eugene, | *Vergennes, Vt.* |
| Brown, Leland Elliott, | Deerfield. |
| Clarke, Chester Thomas, | Reading. |
| Cole, Frederick William, | Greenbush. |
| Copeland, Harvey Leland, | Colrain. |
| Creswell, Albert, | West Brookfield. |
| Davidson, Wilbur King, | West Millbury. |
| Derr, Paul Ambrose, | *Williamsport, Pa.* |
| Drummery, Dennis Edward, | Marlborough. |
| Dustin, Otis Ellsworth, | Monson. |
| Felch, George Alfred, | Ayer. |
| Fennely, N. J., | Boston. |
| Forbes, Ralph Monroe, | Worcester. |
| Gallagher, Hugh John, | New Lebanon. |
| Galarnean, Arthur Leopold, | *North Bay, Ont.* |
| Gaskill, Clayton Wood, | South Milford. |
| Headle, Everett Waldo, | Bolton. |
| Hemenway, Lee, | *Bridport, Vt.* |
| Hepburn, William Kirkland, | Sunderland. |
| Holcomb, Tudor Frederick, | West Granby. |
| Howard, Everett Clapp, | Belchertown. |
| Imlay, William Sylvester, | *Zanesville, O.* |
| Johnson, Esther Marguerite, | Cambridge. |
| Keith, Harold Newell, | West Boylston. |
| Larsen, Augustus Francis, | Pride's Crossing. |
| Lyon, Lawrence Whitman, | Abington. |
| MacDonald, Charles Grant, | Medway. |
| McGauvran, Lizzie, | Fisherville. |
| McGonigle, Cornelius James, | Worcester. |
| McMaster, Percy Elmer, | *New York, N. Y.* |

| | |
|---|---|
| Midgeley, Frank Leonard, | Worcester. |
| Nelson, David Arvid, | Avon. |
| Nevius, Richmond, | Rochester. |
| Nye, Edmund Russell, | Russell. |
| Ordway, Carroll Colby, | West Newbury. |
| Osborn, William, | *Cos Cob, Conn.* |
| Perrin, Emmet Mark Fred, | *Potsdam, N. Y.* |
| Phelps, Arthur Augustus, | Southborough. |
| Phillips, Emerson Orin, | Huntington. |
| Richards, George Frank, | Williamsburg. |
| Schmitz, Eugene Alfonso Ricardo, | Danvers. |
| Smith, William Henry, | Great Barrington. |
| Stone, Daniel Earle, | Attleborough. |
| Sutcliffe, John Rowell, | North Billerica. |
| Tanner, Fred William, | North Adams. |
| Thayer, Robert Eugene, | Franklin. |
| Tilden, J. Alexander, | *Cleveland, O.* |
| Thompson, Charles Wilfred, | Attleborough. |
| Turner, Harvey Gay, | North Reading. |
| Ware, William Crosby, | Concord. |
| Warfield, Arthur Henry, Jr., | West Brookfield. |
| Welch, Harlow, | Boston. |
| Welch, Wilbert Eben, Jr., | Boston. |
| Wilcox, Lauriston Anson, | *North Pownal, Vt.* |
| Young, Earle Leonard, | South Hadley Center. |

Total, 66.

## SUMMER SCHOOL STUDENTS — 1908.

| | |
|---|---|
| Adams, Lena R., | North Brookfield. |
| Allison, Catherine D., | Northampton. |
| Ammidown, Eva B., | Roslindale. |
| Ayer, Elizabeth E., | *Saybrook, Conn.* |
| Barrett, Florence, | Cambridge. |
| Barrett, Mrs. Sarah, | Cambridge. |
| Barry, Mary, | Amherst. |
| Barry, Veronica, | Amherst. |
| Barton, Alice M., | West Roxbury. |
| Bates, Mabel L., | East Wareham. |
| Belcher, S. Elisabeth, | Worcester. |
| Best, Fannie E., | *New Dorp, N. Y.* |
| Billings, Mrs. G. A., | *Washington, D. C.* |
| Breaker, Carl H., | Northampton. |
| Brooks, Laura J., | Stoneham. |
| Buckley, Emma, | Worcester. |
| Burgess, Louisa W., | Dorchester Center. |
| Butterfield, Annie J., | Worcester. |
| Callahan, Mary J., | Worcester. |
| Carley, Lilian M., | *New York City.* |
| Chace, S. Howard, | Lowell. |

| | |
|---|---|
| Chase, Alice C., | Lynn. |
| Cheney, Hazel Chase, | Amherst. |
| Churbuck, Bessie L., | East Wareham. |
| Church, Helen L., | Shelburne Falls. |
| Churchill, Abby P., | Fitchburg. |
| Clark, Eva H., | Sandwich. |
| Clark, Orton L., | Amherst. |
| Clay, Charles L., | Harvard. |
| Clough, Jennie S., | Cambridge. |
| Cochran, Agnes M., | South Boston. |
| Cooney, Helen T., | Lawrence. |
| Cotta, Florence L., | Worcester. |
| Cram, Julia H., | Brookline. |
| Curley, Thomas F., | Waltham. |
| Currier, Frances W., | Brighton. |
| Davis, Carrie I., | Taunton. |
| Davis, Florence I., | Bridgewater. |
| Donelson, Lura, | Greenfield. |
| Dorph, Bernhard, | Amherst. |
| Dorr, Clara L., | Dorchester. |
| Draper, Lizette M., | Worcester. |
| Dunham, Annie D., | Island Creek. |
| Dupuy, Helen A., | *Chicago, Ill.* |
| Earle, Elizabeth, | *New Haven, Conn.* |
| Eaton, Luella, | Needham Heights. |
| Farwell, Minnie G., | Walpole. |
| Fay, Louise, | Waltham. |
| Fletcher, Florence A., | Wakefield. |
| French, Mrs. Clara Graves, | *Weston, Ore.* |
| Gavin, Agnes M., | Roxbury. |
| Gilbert, Pauline, | Amherst. |
| Goodnow, Edna M., | Amherst. |
| Goodwin, Rev. Sherman, | *South Royalton, Vt.* |
| Gracey, F. M., | Amherst. |
| Granger, Helen, | Cambridge. |
| Graves, Bessie M., | Southampton. |
| Greene, Rev. M. N., | Amherst. |
| Griffeth, Mary A., | East Wareham. |
| Gustin, Rev. B. F., | North Amherst. |
| Haskell, Mabelle W., | Lynn. |
| Haskell, Sarah E., | Medway. |
| Hastings, George H., | Fitchburg. |
| Haynes, Julia A., | Hyannis. |
| Heath, Chester B., | Dedham. |
| Heatly, Elisabeth, | Fall River. |
| Hoagland, Rev. N. S., | Tyngsborough. |
| Hopkins, Elizabeth, | Winchester. |
| Howard, Alice M., | Taunton. |
| Howard, Annie G., | Taunton. |
| Howes, A. F., | Sheffield. |

| | |
|---|---|
| Howland, Florence B., | Somerville. |
| Howland, Gertrude S., | Revere. |
| Howland, Mary A., | Sandwich. |
| Hutchings, F. F., | Amherst. |
| Ingalls, Maud, | Cheshire. |
| Ingalls, May D., | Cheshire. |
| Irwin, Grace W., | Sandwich. |
| Jason, May, | New Bedford. |
| Kendrick, Jean, | Amherst. |
| Killion, Anna L., | Roxbury. |
| Kilmer, Sarah E., | Boston. |
| Lamphier, Annie J., | North Adams. |
| Larkin, Martha M., | Lynn. |
| Lewis, Winifred, | Rochester. |
| Lilley, Alice, | Fairhaven. |
| Lillis, Marguerite, | Roxbury. |
| Lovejoy, Blanche S., | Haverhill. |
| Marvin, Donald, | *New London, Conn.* |
| Marvin, Gerald, | *New London, Conn.* |
| Marvin, Mrs. Walter, | *New London, Conn.* |
| Marvin, Rev. Walter, | *New London, Conn.* |
| Mason, Isadore H., | Gardner. |
| Mattson, Mrs. W. F., | Brookline. |
| Mattson, W. Rhoades, | Brookline. |
| Mead, Ella, | *Brooklyn, N. Y.* |
| Meggett, Marshall M., | Brookline. |
| Miller, Susie T., | Brockton. |
| Mitchell, Margaret D., | Charlestown. |
| Mitchell, Mary C., | Charlestown. |
| Morgan, Agnes, | Amherst. |
| Moulton, Sarah H., | West Lynn. |
| Muirhead, Rev. A. Stanley, | East Bridgewater. |
| Murray, Anna M., | Worcester. |
| Murray, E. Frances, | Cambridge. |
| Murray, Florence H., | Cambridge. |
| Murray, Rupert H., | *New Rochelle, N. Y.* |
| Negus, Ruth, | Fall River. |
| Nelligan, K. M., | Amherst. |
| Nevius, Richmond, | Rochester. |
| New, Mary A., | Amherst. |
| Newell, A. E., | South Boston. |
| Nicholson, Madge C., | Wareham. |
| Nishimiya, Masutaro, | Amherst. |
| Oakley, Mary F., | *Brooklyn, N. Y.* |
| Pardee, Rev. J. N., | Bolton. |
| Parker, Agnes C., | Uxbridge. |
| Parker, Winifred Lenore, | Holyoke. |
| Parkhurst, Dorothy, | Amherst. |
| Parsons, Sally, | Lynn. |
| Paul, Maria E., | Lynn. |

| | |
|---|---|
| Paulsen, George W., | *Tremont, New York City.* |
| Perkins, Emily, | Woburn. |
| Phalen, Mrs. Frank L., | Fairhaven. |
| Phalen, Rev. Frank L., | Fairhaven. |
| Pierpont, Rev. John, | Williamsburg. |
| Pond, E. W., | Sheffield. |
| Post, Edna A., | *Gilead, Conn.* |
| Post, Jessie L., | *Gilead, Conn.* |
| Rich, Frank M., | North Weymouth. |
| Robinson, Mrs. Alice M., | South Boston. |
| Robinson, Mary B., | Waltham. |
| Roehrs, Herman I., | *New York City.* |
| Rossiter, Irmagarde, | *Hartford, Conn.* |
| Rowe, Mildred, | Amherst. |
| Roy, G. Calister, | Watertown. |
| Scott, Mary L., | Worcester. |
| Seavey, Alma F., | Natick. |
| Shipman, Julia, | Boston. |
| Shores, Iva, | Amherst. |
| Shumway, Ruby M., | South Amherst. |
| Skerrett, Sarah V., | Worcester. |
| Smith, Annie E., | Springfield. |
| Smith, Hattie E., | Wareham. |
| Stimson, Mrs. Helen M., | Northampton. |
| Stone, Melville A., | Reading. |
| Streeter, Lilla M., | Millbury. |
| Sullivan, Esther F., | Charlestown. |
| Swett, Lena S., | *Burlington, Vt.* |
| Sylvester, Charles B., | Haverhill. |
| Taylor, Rev. James D., | Amherst. |
| Tierney, Margaret E., | Lawrence. |
| Tierney, William A., | Worcester. |
| Tobin, Ellen C., | Lawrence. |
| Tufts, Mary I., | Lynn. |
| Turner, Howard A., | Amherst. |
| Verbeck, Roland H., | Malden. |
| Waters, Mrs. F. P., | *Rocky Hill, Conn.* |
| Waters, Rev. F. P., | *Rocky Hill, Conn.* |
| Waugh, Dorothy, | Amherst. |
| Waugh, Thomas F., | Worcester. |
| Weed, Susan M., | *Wethersfield, Conn.* |
| Weston, Marion L., | Roslindale. |
| Whitton, Jennie E., | *Hazardville, Conn.* |

Total, 166.

## SUMMARY BY CLASSES.

| | | |
|---|---|---|
| Graduate students, | 14 | |
| Special students, | 1 | |
| Senior class, | 50 | |
| Junior class, | 47 | |
| Sophomore class, | 54 | |
| Freshman class, | 116 | |
| | | 282 |
| Winter course, | 66 | |
| Summer school, | 166 | |
| | | 232 |
| Total, | | 514 |

## GEOGRAPHICAL SUMMARY.

| | The College. | The Short Courses. |
|---|---|---|
| Connecticut, | 7 | 15 |
| Delaware, | 1 | – |
| District of Columbia, | – | 1 |
| Illinois, | – | 1 |
| Indiana, | 2 | – |
| Maine, | 2 | 2 |
| Massachusetts, | 236 | 181 |
| Michigan, | 1 | – |
| Missouri, | 1 | – |
| New Hampshire, | 2 | – |
| New Jersey, | 4 | – |
| New York, | 11 | 13 |
| Ohio, | 1 | 4 |
| Oregon, | – | 1 |
| Pennsylvania, | – | 1 |
| Rhode Island, | 3 | – |
| Vermont, | 1 | 10 |
| China, | 4 | – |
| Cuba, | 2 | – |
| England, | 1 | – |
| Japan, | 1 | – |
| Ontario, | 1 | 1 |
| Syria, | 1 | – |
| Totals, | 282 | 232 |

# ADDENDA.

## I.

### ABSTRACT OF THE ADMISSION REQUIREMENTS STATED IN THE CATALOGUE OF 1907–08.

The examinations in June and September, 1909, will be based on these requirements; but certificates will be accepted either on these or on the revised requirements already stated, as the applicant may elect.

*Requirements.*

The candidate to be at least sixteen years old, and to furnish testimonials proving good moral character.

The candidate to furnish an acceptable certificate or to pass an examination showing preparatory study in three groups of studies, as follows: —

*Group I. Language.*

Sub-group 1: English (required).
Sub-group 2: French or German (*one* required).

*Group II. History and Civics.*

Sub-group 1: United States history and civics (required).
Sub-group 2: History (elective; *one* required).
  (*a*) Ancient history.
  (*b*) Medieval and modern history.
  (*c*) English history.
  (*d*) General history.

*Group III. Mathematics and Science.*

Sub-group 1: Algebra, through quadratics (required).
Sub-group 2: Plane geometry (required).
Sub-group 3: Any *two* of the following (required): —
  (*a*) Chemistry.
  (*b*) Physiology.
  (*c*) Solid geometry.

### *Explanation of Requirements.*

GROUP I. LANGUAGE. — In *English,* candidates must be able to meet the usual college requirements (as defined by the College Entrance Examination Board[1]) except that one calling for the detailed study of books under division *B* of the current list of recommended books. The college insists that applicants be able to interpret at sight unfamiliar prose and verse of medium difficulty, and that they be familiar with grammar. The examination will be based on the books here named; but if an applicant wishes to be examined upon others of those included in the standard list, he will be so examined, provided he notify the Department of English by June 1, 1909.

*Books.* — Shakspere's "Macbeth" and "The Merchant of Venice;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Webster's "First Bunker Hill Oration," with either Burke's "Speech on Conciliation" or Washington's "Farewell Address;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine," and "The Passing of Arthur;" Ruskin's "Sesame and Lilies;" Bunyan's "Pilgrim's Progress" (Part I.); Scott's "Quentin Durward;" either Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

In *French* or *German,* candidates must offer one year of elementary work as defined in the requirements of the College Entrance Examination Board.[1]

GROUP II. HISTORY AND CIVICS. — Preparation in the subjects of Group II. will be satisfactory if made in accordance with the recommendations of the Committee of Seven of the American Historical Association, as outlined by the College Entrance Examination Board.[1] The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory.

GROUP III. MATHEMATICS AND OTHER SCIENCES. — It is strongly recommended that students preparing for entrance take the mathematical review offered in most high school courses.

*Algebra.* — Through the first twenty-three chapters of Wells's "College Algebra," or an equivalent. The student should be thoroughly drilled in the fundamental operations.

*Plane Geometry.* — All of plane geometry as given in Wells, or an equivalent.

---

[1] Address sub-station 84, New York City.

*Solid Geometry.* — All of Wells's "Solid Geometry," or an equivalent.

*Chemistry.* — The following chapters in Newth's "Inorganic Chemistry" or Newell's "Descriptive Chemistry," or their equivalents: —

Newth — Part 1. Chapters I. to VII. inclusive.
Part 2. Chapters I. to VIII. inclusive.
Newell — Chapters I. to XII. inclusive.

*Physiology.* — The equivalent of Hough & Sedgwick's "The Human Mechanism." The examination is based on this book.

### *Certification.*

Certificates must present at least 50 per cent. of the subjects required for entrance, and deficient subjects must be made up by examination upon entrance or within the first semester.

The certificate must come from a school approved (*a*) by the college, or (*b*) by the College Entrance Examination Boards, or else must be the usual credentials from the New York State Board of Regents. Blank forms will be furnished, but only to principals or superintendents.

## II.

## Alumni Associations and Class Secretaries.

### *Alumni Associations.*

The Associate Alumni of the Massachusetts Agricultural College.
*President,* Austin Peters, '81, Boston, Mass.
*Secretary,* H. F. Tompson, '05, Amherst, Mass.

The Local Alumni Association of the Massachusetts Agricultural College.
*President,* Robert W. Lyman, '71, Northampton, Mass.
*Secretary,* A. C. Monahan, '00, Turners Falls, Mass.

The Alumni Club of Massachusetts.
*President,* F. W. Davis, '89, Roslindale, Mass.
*Secretary,* Newton Shultis, '96, Boston, Mass.

The Connecticut Valley Association of the Massachusetts Agricultural College Alumni.
*President,* Chas. A. Goodrich, '93, Hartford, Conn.
*Secretary,* Walter B. Hatch, '05, Hartford, Conn.

The Massachusetts Agricultural College Club of New York.

*President,* Chas. E. Lyman, '78, Middlefield, Conn.

*Secretary,* Dr. John A. Cutter, '82, 325 West Eighty-third Street, New York, N. Y.

The Massachusetts Agricultural Club of Washington, D. C.

*President,* C. S. Crocker, '89, 25 South Van Pelt Street, Philadelphia, Pa.

*Secretary,* F. D. Couden, '04, 1310 Columbia Road, Washington, D. C.

The Western Alumni Association of the Massachusetts Agricultural College.

*President,* A. B. Smith, '95, 544 Winnemac Avenue, Chicago, Ill.

*Secretary,* M. H. West, '03, 28 Lindon Court, Chicago, Ill.

## *Class Secretaries.*

| Class of | SECRETARY. | Secretary's address. |
|---|---|---|
| 1871 | E. E. Thompson, . . | Worcester, Mass. |
| 1872 | S. T. Maynard, . . | Northborough, Mass. |
| 1873 | C. Wellington, . . | Amherst, Mass. |
| 1874 | – – | – – |
| 1875 | M. Bunker, . . . | Newton, Mass. |
| 1876 | C. Fred Deuel, . . | Amherst, Mass. |
| 1877 | – – | – – |
| 1878 | C. O. Lovell, . . . | 48 Summer Street, Boston, Mass. |
| 1879 | R. S. Swan, . . . | Worcester, Mass. |
| 1880 | – – | – – |
| 1881 | J. L. Hills, . . . | Burlington, Vt. |
| 1882 | G. D. Howe, . . . | Bangor, Me. |
| 1883 | S. M. Holman, . . | Attleborough, Mass. |
| 1884 | L. Smith, . . . | 25 Mercantile Street, Worcester, Mass. |
| 1885 | E. W. Allen, . . . | Washington, D. C. |
| 1886 | Dr. Winfield Ayres, . | 616 Madison Avenue, New York, N. Y. |
| 1887 | F. H. Fowler, . . | 136 State House, Boston, Mass. |
| 1888 | H. C. Bliss, . . . | Attleborough, Mass. |
| 1889 | C. S. Crocker, . . | 25 South Van Pelt Street, Philadelphia, Pa. |
| 1890 | F. W. Mossman, . . | Westminster, Mass. |
| 1891 | W. A. Brown, . . | Greenfield, Mass. |
| 1892 | H. M. Thomson, . . | Amherst, Mass. |
| 1893 | F. A. Smith, . . . | Ipswich, Mass. |
| 1894 | S. F. Howard, . . | Amherst, Mass. |
| 1895 | H. A. Ballou, . . | Barbadoes, W. I. |
| 1896 | – – | – – |
| 1897 | C. A. Peters, . . . | Moscow, Idaho. |
| 1898 | S. W. Wiley, . . . | 15 South Gay Street, Baltimore, Md. |
| 1899 | D. A. Beaman, . . | Ponce, Porto Rico |
| 1900 | E. K. Atkins, . . | Northampton, Mass. |
| 1901 | J. H. Chickering, . . | Dover, Mass |
| 1902 | H. L. Knight, . . | 1731 T Street, Washington, D. C. |
| 1903 | G. D. Jones, . . . | North Amherst, Mass. |
| 1904 | P. F. Staples, . . . | North Grafton, Mass. |
| 1905 | P. F. Williams, . . | Milton, Mass. |
| 1906 | Richard Wellington, . | Geneva, N. Y. |
| 1907 | G. H. Chapman, . . | Amherst, Mass. |
| 1908 | Jas. A. Hyslop, . . | 205 D Street, Washington, D. C. |

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Public Document No. 31

# FORTY-SEVENTH ANNUAL REPORT

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE.

## PART I.

REPORT OF THE TRUSTEES AND OTHER OFFICERS
FOR FISCAL YEAR ENDED NOV. 30, 1909.

JANUARY, 1910.

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# The Commonwealth of Massachusetts.

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MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, Dec. 1, 1909.

To His Excellency EBEN S. DRAPER.

SIR: — I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part I. of the forty-seventh annual report of the trustees of the Massachusetts Agricultural College, for the fiscal year ended Nov. 30, 1909, this being the report of the president and other officers to the corporation of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
*President.*

# REPORT OF THE PRESIDENT OF THE COLLEGE.

*Gentlemen of the Corporation.*

I herewith submit my fourth annual report as president of the college.

## ATTENDANCE.

The attendance of students of college rank for the last college year exceeded that of the previous year by 29, and aggregated 268 four-years men and 14 graduate students. There were 232 in various short courses, or a total attendance of 514. The entering class the present autumn numbered 131, the largest previous freshman class being 116, a year ago, and the largest one previous to that 88. The total number of four-years men in present attendance is 316, of unclassified 12, and of graduate students 19. (See Table I.)

There are some rather interesting facts connected with the census of the present freshman class. Eighty-five per cent. of them come from Massachusetts, with 7 other States and 1 foreign country, China, represented. The 111 men from Massachusetts come from 69 towns and cities, and from every county except Dukes and Nantucket. Only 10 per cent. of the freshman class come from Hampshire County, in which the college is located; 3 counties equal or exceed Hampshire in number of men, namely, Middlesex, Worcester and Suffolk.

One-fourth of the class are undecided as to their intended vocation, but 70 per cent. of the whole class, or 94 per cent. of those having made a decision, stated that they intended to follow either technical or professional agriculture or horticulture.

Table IV., which develops these facts, also shows that only a little over one-fifth of the fathers of members of the freshman class are engaged in agriculture or horticulture. A slightly larger number are artisans, and a slightly smaller number are business men.

### Appropriations.

The total amount of special appropriations asked of the last Legislature, including $30,000 for reimbursement for loss of barn by fire, was $201,105. Of this amount the Legislature granted $158,500. We also asked for an increase in the annual current appropriation of $42,500; the amount granted was $22,000. (See Table II.)

### New Buildings.

The new buildings and important improvements granted by the last Legislature are much-needed additions to our facilities. The building for entomology and zoölogy will be, when completed, the largest and finest laboratory on the campus, and indeed in its equipment and accommodations for the particular subject of entomology is probably not surpassed in the country.

The addition to the heating plant is a long step ahead in the development of a more complete heating system for the rapidly growing college plant.

In reconstructing the barns the trustees very wisely decided to build several buildings, instead of one, for housing the stock and implements.

Brief descriptions of all these improvements are appended.

*Entomology and Zoölogy.* — The new building for the departments of entomology and zoölogy has a frontage of 126 feet and a depth of 100 feet, and consists of a basement, two stories and an attic. In the basement are rooms to be used as geological and mineralogical laboratories, insecticide analysis, a rock museum, a pump room, and the lower portion of the amphitheatre. On the first floor are situated the zoölogical laboratory, the zoölogical museum, rooms for the department of entomology of the experiment station, the upper portion of the amphitheatre, several supply rooms and offices. On the second floor are the entomological laboratories, the insect collection, library, a small lecture room for advanced classes, the gallery of the zoölogical museum, the advanced zoölogy laboratory and several supply rooms and offices. In the attic are rooms for photography and janitor's quarters. Connected with the experiment station portion of the building is the greenhouse already erected.

The plans for the building, which is nearly fireproof, were prepared by C. P. Hoyt of Boston, and the constructors are the Allen Brothers of Amherst.

*The New Barns.* — (1) The upper storage barn is smaller than the old one, and forms a connecting link between the cow stable and the two silos, 72 feet to the north of it; these structures were built in 1907 of cement blocks. The new barn is of the same outside finish, but the walls are constructed of hollow terra-cotta blocks, — a drier, lighter and less expensive construction, that our architect believes will prove equally as good. The building is 98 by 50 feet, and furnishes sufficient storage for hay, grain, and bedding to supply the 66-cow stable adjoining.

(2) About 200 feet to the west is a complete barn for young stock and bulls. It consists of a rectangular storage barn with stables in one-story wings on the south. The storage is 87 by 37 feet; it has a gambrel roof, a truss frame, and no interior posts. The stables furnish stanchions for 18 head of cattle and 5 good-sized box stalls, also 4 box stalls with separate yards for bulls. The building is of wood, with slate roof and shingle siding. The cost of maintenance should be low.

(3) A building to house farm tools and implements is in course of construction. It is 100 by 40 feet, and is being built on an old foundation, which allows easy access on each of the two floors. It will have a slate roof and terra-cotta block walls, with pebble-dash finish on the outside.

The architect of all these structures is Mr. James H. Ritchie of Boston. Allen Brothers of Amherst erected the barn for young stock and the tool barn; George E. Bosworth of Amherst the upper storage barn.

*Extension of Heating Plant.* — The repairs this summer have required the presence of a large gang of workmen on the grounds during the summer vacation. The most important work has been the extension of the heating system. The old line to the chemical laboratory, 300 feet, was taken up and a new 8-inch main put in its place; from this point a new 7-inch main was run across to the east side of the campus, 1,425 feet to the manhole in front of Wilder Hall. Here the line was reduced to 6 inches and carried to Wilder Hall, connecting with the 5-inch main that supplies French Hall and the glass house range. The

2-inch line connecting with the old botanical laboratory was taken up and a 4½-inch main put in. This was done for the purpose of extending a 3½-inch main to the old Durfee plant and vegetable packing houses, 485 feet distant. From the manhole in front of Wilder Hall the old 4-inch main to Clark Hall was taken up and a new 6-inch main put in. At this point the 6-inch main was extended 350 feet southerly to a manhole, thence easterly to the new entomological laboratory, a distance of about 350 feet. In all 2,560 feet of new and 1,455 feet of replacing pipe line have been put in.

*Other Improvements.* — A new 100-kilowatt dynamo and Curtess turbine engine of the General Electric make have been installed, also a contract has been entered into with the Terry Turbine Company to furnish a turbine and a 50-kilowatt Westinghouse dynamo. This will take care of our present and future needs for some time. At the drill hall, which is our only place for gymnasium work, a new bath house has been built and furnished with five Speakman shower baths. The ceiling in the drill hall has been brought down on to the cross beams, thus making the room much easier to heat. The roofs of station and horticultural barns have been slated, and the foundation of the horse barn has been raised.

## COMMENCEMENT.

Commencement was held June 23, and the college conferred the degree of Bachelor of Science on 50 men, and the degree of Doctor of Philosophy on 1.

The commencement address was given by Hon. Gifford Pinchot, United States Forester, and was one of the most inspiring and helpful addresses which has ever been delivered from the college platform.

The attendance at the alumni dinner was 177, a number which has been exceeded only once, I am told, in the history of the Associate Alumni.

## SUMMER SCHOOL.

The summer school registration for 1909 was 176. The same general lines of work followed for the two previous years were developed the past summer. The attendance showed a rather larger proportion of men among the teachers, and also a rather notable increase in the number of high school teachers of science.

Under Professor Hart's direction, a very satisfactory and fairly well attended Conference on Agricultural Education was held at the close of July.

The summer school for country clergymen, which drew an attendance of about 12 clergymen in 1908, registered this year 39 clergymen, and quite a number of teachers also stayed over for at least half of the time allotted to the clergymen, and took more or less of the work. This particular feature of the summer school has attracted considerable attention in this and other States, and I believe is going to prove a very important plan in forwarding the country life of the Commonwealth. It goes without saying that this college offers to these clergymen no work which in any way can be construed as sectarian, but merely presents, for the benefit of country clergymen of all denominations and faiths, some of the technical, economic and social problems of our country life.

## The Graduate School.

The number registered in the graduate school for the last college year was 14; this number has been increased to 19 for this autumn. This increase in number represents a natural growth due probably to the enlarged facilities already offered through the definite organization of a graduate school. The larger part of these students are graduates of our own college. While it is desirable to encourage our best men to take graduate study here, it is also of great importance to attract graduates of other institutions to pursue those lines of graduate study at this institution for which we have special facilities.

The faculty of the graduate school are also considering the advisability of some professional courses along agricultural and horticultural lines.

I think it is very important that the graduate school should be given larger recognition by the legislature. The demand for men thoroughly trained in scientific and technical lines is far beyond the supply, and we ought to strengthen this phase of our work in every way possible.

## Unclassified Students.

The trustees committee on the course of study and faculty have approved a plan adopted by the college faculty to admit as unclassified students persons not desiring to take the required four-years course. This is somewhat of a departure from the traditional practice of the college. Its purpose is to afford larger opportunities for an increasing number of people who have not the time for a full course, or who desire to specialize in some narrow line of technical agriculture or horticulture.

The rules governing the admission of such students are quite strict. Candidates must be at least twenty-one years of age; they must have had a high school course or its equivalent; they must take a certain minimum of work; they are under the direction of a special committee of the faculty; they are not allowed to stay more than two years, without special permission; they must show themselves thoroughly faithful students.

This autumn, 12 persons have taken advantage of this new arrangement.

## Changes in Requirements for Admission.

The new requirements for admission, adopted by the faculty and approved by the trustees committee on the course of study and faculty, go into full effect in the autumn of 1910. In brief, they raise the standard of admission to the college from approximately eleven and one-half Carnegie units to fourteen Carnegie units (a " Carnegie unit " being the pursuit of a given study for five periods a week for forty school weeks). This definition and this standard of fourteen units have been laid down by the officers of the Carnegie Foundation for the Advancement of Teaching. Thus the college now comes, for the first time in its history, strictly to a college and university basis of admission. The entrance requirements are also notable in giving entrance credit for a large number of subjects, as well as requiring certain specified subjects, such as English, mathematics and a modern language.

It will be of interest to the trustees to know that before the faculty finally adopted these requirements an outline of them was sent to all the high school principals of the State, with the request that they make criticisms of the plan. As a result of this canvass some changes were made, and it is believed that the new requirements not only place the college on a high plane of scholarship, but that they do not get us away from our natural constituency. Even the smaller high schools of Massachusetts can, we believe, meet these requirements.

## New Courses.

In the catalogue issued for the year 1908-09, some 50 courses were added to the list already offered. Most of these were elective courses. Nine of them were added to the division of agriculture; 6 to the division of horticulture; 22 to the division of the humanities; 6 to the department of physical education; 4 to the department of rural social science; 2 to the department of general and agricultural chemistry.

These additions are in accordance with well-defined principles for the development of the institution; namely, the differentiation of subjects and the addition of new courses as rapidly as practicable, in order to cover the whole field of agricultural education, at the same time offering fair opportunities for work in the humanities.

## Changes in Faculty and other Officers.

In July Dr. Robert D. MacLaurin, lecturer in organic chemistry and research chemist of the experiment station, resigned both positions. Dr. MacLaurin had been connected with the institution two years, and had shown himself a brilliant chemist and a superior instructor.

Prof. George N. Holcomb, assistant professor of political science, resigned this position, but is retained as lecturer in history. Professor Holcomb possesses a wide range of knowledge of social subjects, and is peculiarly fitted to deal with such courses in the interpretation of history and the development of human thought as it is hoped he may continue to give as lecturer.

The work in political science is cared for by the appointment of Elmer K. Eyerly as assistant professor of political science. Professor Eyerly graduated with an A.B. degree from Franklin and Marshall College in 1888, and took the A.M. degree from the same institution in 1893. For one year after graduating from college he was a student in Yale Divinity School. He then became professor of political economy in Redfield College, South Dakota, and continued in this position until 1893, spending the year 1891-92 abroad, partly in study at the University of Berlin. From 1893 to 1899 Professor Eyerly was professor of English literature in Yankton College, South Dakota, resigning to take a similar position in the South Dakota Agricultural College. This position he retained until 1907, when he entered the University of Chicago for graduate work in economics and sociology, preparatory to specializing in rural sociology. It is hoped that Professor Eyerly may have special opportunities in this institution to develop the latter subject.

During the year the title of Prof. Edward A. White was changed from that of assistant professor of floriculture to that of professor of floriculture.

Prof. Philip B. Hasbrouck is spending the year on leave of absence, and his work in physics is being taken by Prof. Joseph O. Thompson of Amherst College, and his work in mathematics by Capt. George C. Martin of this college.

Mr. Frank M. Gracey, for two years assistant in landscape gardening, resigned to accept a position in the Massachusetts Institute of Technology, and the vacancy was filled by Mr. John Noyes, a graduate of the class of 1909, who had specialized in the department of landscape gardening.

It seemed desirable to secure another teacher of professorial rank in the department of general and agricultural chemistry. In order to make this possible, it was necessary for the present to abandon the three assistantships in that department. One was already vacant, and Mr. Leon I. Shaw and Mr. Ernest C. Fowler, both of whom had very satisfactorily filled the requirements of their positions, resigned.

Mr. Philip V. Goldsmith resigned his position as assistant chemist in the experiment station, to accept a lucrative position. His place was taken by Mr. J. F. Merrill, a graduate of the University of Maine, in the class of 1907.

Mr. Carl D. Kennedy, a graduate of the New Hampshire

College in the class of 1909, has also been employed as assistant chemist in the experiment station.

In the summer, Miss Edith C. Hubley resigned her position as clerk in the division of horticulture, and since September, Miss Helen Granger, an unclassified student in the college, has been giving a portion of her time to that work.

## Officers for new Positions in the Institution.

In addition to the changes in existing positions, a number of new positions have been created during the year, and have been filled as follows: —

Wm. D. Hurd was appointed director of short courses, and took up his work with us September 1. Professor Hurd received the degree of Bachelor of Science from the Michigan Agricultural College in 1899, and the degree of Master of Agriculture from his Alma Mater in 1909. For three years after graduation from college he taught in the Lansing schools; for one year he served as professor of horticulture in the School of Practical Agriculture and Horticulture at Briarcliff Manor, N. Y. When that school disbanded, he became for a time supervisor of extension work at the Rhode Island State College. In the autumn of 1903 he was made professor of agriculture in the University of Maine, and was advanced to the deanship of agriculture in that university in 1906. He succeeded in building up in a comparatively short space of time a splendid work in the College of Agriculture, adding many new courses, organizing a number of departments under energetic men, and in every way strengthening the work. He was also very successful in reaching the farmers of the State, through various forms of extension work. He is already somewhat familiar with Massachusetts conditions, and in the summer school of 1908 was one of the prominent lecturers. He thus brings to his work wide experience as a farm boy, a graduate of an agricultural college, a worker in agricultural education both east and west, splendid organizing and administrative ability, untiring energy, and a vision of the possibilities of helpful work for the rank and file of the toilers of the farm.

The new position in the department of general and agricultural chemistry, already referred to, was filled by the appointment of Dr. Joseph S. Chamberlain as associate professor of chemistry. Professor Chamberlain graduated with the degree of Bachelor of Science at the Iowa State College of Agriculture in 1890, received the degree of Master of Science from the same institution in 1892, and the degree of Doctor of Philosophy from Johns-Hopkins University in 1899. During the past year he has been a student of chemistry in the University of Berlin. His services were rendered first as laboratory assistant in chemistry in the Iowa State College, for two years following his graduation; as instructor in chemistry in the same institution for three years; as instructor in chemistry in Oberlin College for two years; after graduate work at Johns-Hopkins, as private research assistant to Professor Remsen in Johns-Hopkins University; and for eight years as assistant chemist and chief of the Cattle Food Laboratory of the Bureau of Chemistry of the United States Department of Agriculture. Thus Dr. Chamberlain has had wide and varied experience as a teacher and experimenter, thorough training in the essentials of his subject, and ample experience in the application of chemistry to agricultural problems.

The new position of instructor in English and public speaking was filled by the appointment of Mr. Fred B. McKay, a graduate from the Michigan Normal School in 1904. He received the degree of Bachelor of Arts from the University of Michigan in 1909. He has had experience as teacher in the rural schools of Michigan, as principal of a high school in an agricultural community, and as superintendent of schools in a small city. During his university course he was assistant in reading and oratory of the Michigan Normal College, and had special training both in literature and oratory. His appointment gives us a chance to give thorough training in a much needed direction.

The new work in cranberry investigation, under the auspices of the experiment station, is to be developed by Dr. H. J. Franklin, who graduated from this college in 1903 with the degree of Bachelor of Science, and who for five years thereafter pursued graduate work in our own department of graduate study, receiving in 1908 the degree of Doctor of Philosophy. While following this graduate work Dr. Franklin had large experience in insect investigations in the cranberry districts of Massachusetts. During the year 1908-09 he was Assistant State Entomologist in Minnesota. The cranberry growers are themselves assisting in promoting this most important work, and we are assured, through Dr. Franklin's thorough knowledge of the situation and his untiring patience as an investigator, that substantial results will come out of his work.

Mr. John N. Summers, who has been since his graduation from this college in 1907 a graduate student in entomology and assistant entomologist in the experiment station, was made teaching assistant in the college department of entomology.

Mr. Charles H. White, a graduate of the college in the class of 1909, was appointed field agent. His work during the past autumn has been to get in touch with a number of the high schools of the State. After the holidays he will assist Professor Hurd in the short course work.

The new position of purchasing agent, who has charge of all the buying of supplies, both for the dining hall and for certain college purposes, under the direction of the treasurer, was filled by the appointment of Mr. Burke Hough. Mr. Hough graduated several years ago from the Connecticut Agricultural College, and has had considerable business experience.

Mr. J. Robert Parker, a graduate of the college in 1908, and for one year teacher in agriculture and science in the Montague High School, was appointed graduate assistant in the department of entomology.

Miss Ola H. Perrin was appointed clerk to the director of short courses.

Miss Ruth G. Smith was appointed clerk to the dean and the registrar.

Mr. James Whiting, foreman for several years at the Waban Conservatories, Natick, and a superior rose grower, was appointed last July foreman in the department of floriculture.

## Athletic Field.

The Legislature granted $5,500 for the purchase of land, although our request was for $15,000, and this request was accompanied by a statement that it would take at least $25,000 to purchase all the land really necessary for college uses. This action of the Legislature was a severe blow to carefully prepared plans for the development of an adequate athletic field and recreation grounds. Options had been secured on a number of parcels of ground, most of which were to expire in the summer. It was feared that if these options were allowed to expire it would be impossible to renew them, and the land would pass into other hands, thus destroying all hopes of developing an adequate field near the college grounds.

At this juncture a number of the trustees volunteered to purchase the so-called Kellogg farm, and to hold it in trust for the college until funds can be obtained for its purchase by the institution. With the legislative grant, other parcels of land necessary for the development of the plan were brought into possession of the college.

There are still several areas of land needed in order to develop the plan. Some of these parcels are held by fraternities, which are considered as " friendly interests." We need, therefore, from the Legislature an appropriation sufficient to take the Kellogg farm off the hands of the trustees, to purchase the Louisa Baker land, to make exchanges of land with the fraternities, and for some incidental expenses connected with placing the field at the disposal of the alumni. At an informal meeting of the members of the trustees committee on buildings and grounds with representatives of the different fraternities owning land, the following resolutions were passed: —

1. That the athletic field should be located on land lying to the south of the present college property, and on or near Lincoln Avenue.

2. That, if the college assigns land permanently for the purposes of an athletic field, the alumni should endeavor to provide for the fitting of the field for athletic purposes.

3. That, under some general proposition to be made in the future by the college, the various fraternity corporations now owning land in the vicinity of the college estate should endeavor to comply with the wishes of the college with respect to location of future fraternity houses, and the exchange of property with the college on the basis of a fair appraisal of values.

These resolutions indicate the general policy which we hope to follow; namely, that of securing land in one body just south of the present college grounds, which will be sufficient not only for an enclosed athletic field, but also for adequate recreation grounds for all of our students.

It is expected also that the alumni will furnish funds for fitting up these fields for the purposes desired.

## Development of the College Campus.

During the year fresh details concerning the plan for the location of probable future buildings and the general development of the college campus, the main outlines of which have already been accepted by the trustees, were made public through an interesting presentation by Mr. Warren H. Manning, before an audience of college people and friends of the college.

In order to develop the grounds properly under this comprehensive plan of Mr. Manning's, we should have a sum of money coming to us regularly each year for the purpose of building and rebuilding roads, constructing walks and drives, making new plantings, mowing the lawns, and in general maintaining and developing the area of some 70 acres which are naturally included within the campus proper. This work should be under the general supervision of the department of landscape gardening, with a person in charge as superintendent of grounds.

## New Buildings needed.

*For Animal Husbandry.* — Last year the Legislature struck out of our appropriation bill the item of $8,000 for a stock-judging pavilion; but it is important that we ask the Legislature once more for this building. At the present we have no facilities whatever for carrying on this very practical branch of construction. All of the larger agricultural colleges have such a building, and emphasize this type of work. The plan has been endorsed by the Connecticut Valley Live Stock Breeders' Association, and appeals to all practical men. The objection may be raised that this is not a live stock State. As to that, the college can assist in arousing interest in the live stock industry far more fully if it has practical facilities of this type to work with. Furthermore, the dairy industry is a very important branch of agriculture in Massachusetts, and the judging of dairy cattle is an essential phase of teaching the subject of dairying. It is to be noted, also, that this stock-judging pavilion, or barn, has other uses than purely for stock judging. Our present plan provides two large class rooms which are very much needed for our short courses and for some of the larger classes in agriculture. Demonstrations along other lines than stock judging may also be given in this building. Exhibits may be placed here in farmers' week, and, in fact, the building could be used for gatherings of farmers to great advantage. It is not an expensive building, and it will be very useful.

*Dairy Building.* — Milk dairying must necessarily become one of the leading lines of instruction and experiment at this college. Even with our present very meager facilities, consisting of a small dairy room in the basement of south dormitory, and the milk room at the dairy barn which necessarily can be used but very little except for instruction purposes, the interest in dairy work is rapidly growing. This winter we were obliged to limit the number of men in the short course who could take dairying, and about 30 of the regular four-years students have elected the subject.

Plans have therefore been prepared for a dairy building entirely for instruction purposes, very complete and modern in its equipment, and so arranged that its capacity can be increased 50 per cent. with comparative ease.

*Poultry Buildings.* — Last year we asked the Legislature for the sum of $3,000 for the erection of a small poultry plant for instruction purposes. Although this appropriation was strongly supported by the practical poultry men of the State, the item was cut out of our legislative budget. It seems a little invidious that a prominent agricultural college, after forty years of work, situated in a State where poultry keeping is an important and growing industry, should have practically no facilities for instruction in this branch.

*For Practical Pomology.* — For two successive winters we have asked the Legislature for a small sum in order to construct a fruit storage building. This building is of increasing importance both to pomology and to the department of market gardening. The number of men electing these subjects is constantly increasing, and the present storage facilities are grossly inadequate for practical purposes, to say nothing of the very important place occupied by practical work in teaching these subjects. It should be noted that this building is not primarily for storage, but for instruction.

*Additions to Draper Hall.* — I understand that the original plan for Draper Hall called for an expenditure of about $52,000, which was afterwards cut to about $37,000, and out of which the present Draper Hall was built, having a capacity in the dining room of about 325. The original plans would have given a capacity of about 500. There is now room in the dining hall for not over two or three more tables, and, in fact, more than one more table will crowd the room rather seriously. When the short course students arrive, they will all have to be served at a second table. The probabilities are that next autumn there will be 375 to 400 candidates for seats in the dining hall, and if the present rate of growth of the college is maintained, in the autumn of 1911 there will be not less than 450 candidates for permanent seats.

Plans have therefore been prepared which call for an appropriation of approximately $20,000 to make additions to the kitchen, serving room and dining room of Draper Hall, thus giving seating room for 150 more persons. It is very important that this appropriation be granted this year, because this addition can hardly be completed before Jan. 1, 1911.

*Reconstruction of West Experiment Station.* — For some time the department of chemistry of the experiment station has felt the pressure of inadequate room. The control work performed by the experiment station is also housed in the same building, and is a work which is also increasing in amount.

After considering very carefully the various plans for enlarging the room that may be placed at the disposal of both of these lines of work, it seemed best to the committee on buildings and grounds to secure plans for the enlargement of the present building, by adding one story to the rear portion, and by changing the plan of the lower floor of the same.

*Dwellings for Officers of the Institution.* — The houses now occupied by Professors Waugh and Hasbrouck on the college campus are entirely unfit for occupancy by members of the faculty, and they should be vacated and removed; they are both old buildings, beyond repair. It is due these and other college officers, who feel that it is wise for them to live upon or near the grounds, either that the college build residences to be rented to them, or lease land at a nominal sum on which they can build their own residences. I consider it important that a general policy with respect to this question of faculty houses shall be adopted by the trustees in the immediate future.

*Dormitories.* — I have no recommendations at present as to the general policy of the college with respect to dormitories, but Mr. Warren H. Manning has presented to us tentative plans for an inexpensive dormitory of the bungalow type, which it seems can be built at an exceedingly low cost, and still be substantial, convenient and pleasant. I am inclined to think that the plan is worth trying, inasmuch as the initial investment is comparatively small.

*A Sewerage System.* — Mr. Manning, in connection with the general plan for the development of the grounds, has outlined a general sewerage system. The most important factor in developing this system, however, is the question of sewage disposal.

The committee on buildings and grounds has begun negotiations with the State Board of Health and with experts, and also with the selectmen of the town of Amherst, in regard to a comprehensive system of sewage disposal, co-operating also with the town with reference to the sewage disposal of that part of the town lying next the college grounds.

*Agricultural Building.* — Acting under the instructions of your Board, Professor Foord is now at work on plans for a large and modern building for agriculture. The time has arrived when we can no longer justify the woefully meager facilities of class-room, office and laboratory now vouchsafed the rapidly growing division of agriculture. It is hoped that these plans will be ready for your consideration within the coming year, and I trust they may be presented to the Legislature of 1911. We certainly need for this division a most generous provision; the work ought to be housed in one of the most complete and dignified buildings on the campus.

*Library Building.* — Tentative plans are also under way for a building adequately to house the library. Our present library is not fireproof. The stack room will soon be completely exhausted. The seating facilities for accommodating students and faculty are already taxed far beyond their capacity. We ought to have in the very near future a thoroughly modern library building, planned on a scale sufficiently generous to afford ample accommodations for a growing library for many years to come.

Without question, this library should be in the form of a memorial to the late President Henry H. Goodell, whose energy and toil were so largely expended in the building up of this splendid collection of books.

## Normal Department.

After two years of work, the time seems to have come for the enlargement of the normal department of the institution, or, as it is known in college circles, the department of agricultural education. The movement for introducing agriculture into the public schools is constantly gaining ground. The schools look to us for guidance, and to some degree for supervision. During the past year and a half we have been definitely co-operating with the State Normal School at North Adams, in furnishing instruction in agriculture to the normal school students and for some degree of supervision in the introduction of agriculture into the schools of northern Berkshire County.

The trustees have also authorized a thorough study to be made by this department of a system of agricultural education in the public schools of the Commonwealth. These new lines of work mean increasing responsibilities and assistance, and it is important that the present appropriation of $5,000 a year for this department shall be considerably enlarged.

## Increased Appropriations for Instruction Purposes.

During the past three years quite a number of new positions have been created, both in the station and in the college work. But a mere list of the positions which ought to be developed in the near future forms sufficient argument for a considerably increased annual appropriation for instruction purposes.

A teacher is needed to develop good instruction in poultry keeping, and to give this branch of work its rightful place.

We have no facilities whatever for teaching farm mechanics, nor any place whatever for teaching agricultural engineering; and yet this whole field, utterly neglected by us, is rapidly becoming one of the most important phases of agricultural instruction.

Last year we asked the Legislature for funds for taking on an instructor in poultry keeping and an instructor in farm mechanics. Certainly it is to be hoped that the next Legislature will meet these requests.

At present one instructor is teaching all the courses in government and economics. At least two men are needed to develop these lines of work in a proper manner.

The subject of plant breeding is one that is attracting attention in all our agricultural colleges, and we must soon provide a man who can give all his time to the problems to be considered under this subject.

The importance of courses in literature and philosophy will soon bring us to the development of these lines of work much more completely than at present.

The subject of horticultural manufacture will soon call for a man.

The head of the department of farm administration will soon call for an assistant.

We are already in immediate need of another man in animal husbandry.

A department of bacteriology should be developed.

In order to properly place the college before the people of the State, we ought to be able to employ one man who shall give all his time to publicity work.

The increase in the student body calls for several new instructors at once, in order that our instruction, particularly to freshmen and sophomores in the required subjects, may be kept on a high grade, by allowing us to form small sections.

### Permanent Appropriation for Repairs.

The sums asked from the Legislature for the past three winters under the item of repairs and minor improvements have ranged from $8,000 to $20,000. Our present method is to assemble the requests for these purposes from all the departments of the college, to reduce the sums asked for to the lowest possible terms, and to ask the Legislature for sufficient money to cover these items. Each year the Legislature has chosen to make a further cut in the amount of money. Thus it happens that we are not enabled to make repairs that department heads think necessary; and, furthermore, we are obliged to go to the Legislature with a long list of minor items which it seems to me ought to be left to the judgment of the trustees.

I think, therefore, that an appropriation of $15,000 a year for repairs, and for minor improvements that do not call for a contract above $2,000, should be requested of the Legislature. Our present inventory of college and station buildings will approximate, when the new building for entomology is completed, $500,000. Three per cent. a year would not seem to be an excessive amount for these two items of repairs and minor improvements. If we allow 2 per cent. for repairs, or $10,000, and $5,000 for minor improvements we shall barely meet the needs of the institution, assuming that new buildings are to be occasionally added to the college inventory.

## Permanent Appropriation for Maintenance and Equipment.

Much the same arguments will apply to a request for an annual appropriation which may be used for the up-keep of live stock, implements, books and teaching apparatus. All of these things are necessary in our instruction. The college inventory of this equipment is $175,000, and will soon be $200,000. Five per cent. a year for replacing and for keeping equipment thoroughly "up to date" would not seem to be excessive. This would mean $10,000 a year. Personally, I think that 10 per cent. a year is none too much for these purposes. When a new building is constructed, it always calls for new equipment, and this should be made in every case a special legislative item in connection with the building project.

## SHORT COURSES.

The time is ripe for organizing both our winter school work and our summer school on a more permanent and larger plan. The demands for correspondence courses, for lectures and for advice and assistance are increasing by leaps and bounds. The New England fruit show of last October is the direct cause for a flood of inquiries coming into our department of pomology. The appointment by the Boston Chamber of Commerce of a permanent committee on agriculture has stimulated many lines of agricultural propaganda which we must share. It is important that we shall follow up the fruit show with a comprehensive campaign for apple growing. Other similar lines of endeavor must be developed in the near future. The State Board of Agriculture, the steam railroads, the trolley lines, the granges, and other agencies, organizations and individuals are more than ever before calling upon us for assistance. We must organize this work in a comprehensive way.

## CHANGES IN THE BOARD OF TRUSTEES.

During the year there have been three important changes in our Board of Trustees, one by change of office and two by death.

President Carroll D. Wright, for a little over three years a member of this Board, died at his home in Worcester last February. Although Colonel Wright had had but a short term of service with us, he had endeared himself to every member of the Board, had again and again proved his interest in the college, had shown his grasp of its problems and had lent it his splendid influence.

In July Mr. J. H. Demond passed away, at the ripe age of eighty-four. He had been a member of the Board for twenty-eight years, and when he was in his prime was a vigorous and influential member of the Board. He had served on some of the most important committees. He retained his interest in the college until the very last.

Mr. George H. Martin, formerly Secretary of the State Board of Education, was *ex-officio* a member of this Board. Owing to changes in the Board of Education, his place on our Board was taken by another. It is a delight to record the fact that Secretary Martin had shown an unusual interest in the college and its work. We could count on him for sympathy and advice, and we owe much to him for exalting our work and purposes among the school men of Massachusetts.

We rejoice that strong and able men have come to us to take the places of those who have gone. In Dr. Davis R. Dewey, Hon. Charles E. Ward and Dr. David Snedden we are to have new support and fresh suggestions.

Respectfully submitted,

KENYON L. BUTTERFIELD.

AMHERST, MASS., Nov. 30, 1909.

# STATISTICS OF THE COLLEGE.

### TABLE I. — *Attendance.*

| | For Year ending June 30, 1909. | For Year ending Nov. 30, 1909. |
|---|---|---|
| Graduate students, | 14 | 19 |
| Senior class, | 50 | 45 |
| Junior class, | 47 | 50 |
| Sophomore class, | 54 | 90 |
| Freshman class, | 116 | 131 |
| Unclassified students, | 1 | 12 |
| | 282 | 347 |
| Short courses: — | | |
| Winter course, 1909, | 66 | 66 |
| Summer school, | 166 [1] | 176 [2] |
| | 232 | 242 |
| Total, | 514 | 589 |

[1] Summer of 1908.

[2] Summer of 1909.

### TABLE II. — *Legislative Budget, 1909.*

| ITEMS. | Asked. | Granted. |
|---|---|---|
| 1. Reimbursement for loss of barn by fire, | $30,000 00 | $30,000 00 |
| 2. Special appropriations: — | | |
| New equipment, | 13,605 00 | 10,000 00 |
| Repairs and minor improvements, | 40,000 00 | 33,000 00 |
| Land, | 15,000 00 | 5,500 00 |
| Buildings: — | | |
| Laboratory for entomology, | 80,000 00 | 80,000 00 |
| Farm house, | 2,500 00 | – |
| Fruit storage house, | 3,000 00 | – |
| Buildings for poultry department, | 3,000 00 | – |
| Stock-judging pavilion, | 8,000 00 | – |
| Dwelling house for head of division of horticulture, | 6,000 00 | – |
| | $201,105 00 | $158,500 00 |
| 3. Increase in annual current appropriations: — | | |
| Instruction, | $13,000 00 | $7,500 00 |
| Maintenance, | 12,000 00 | 7,000 00 |
| Graduate school, | 5 000 00 | 2,500 00 |
| Short courses, | 5,000 00 | 2,500 00 |
| Student labor, | 2,500 00 | 2,500 00 |
| Normal department, | 1,000 00 | – |
| Agricultural survey, | 4,000 00 | – |
| | $42,500 00 | $22,000 00 |

## TABLE III. — *Speakers for the Year.*

### *Speakers at Sunday Services for Year ending Nov. 30, 1909.*

**1908.**
Dec. 6. — Rev. F. G. Goodwin, Providence, R. I.
Dec. 13. — Dr. W. D. MacKenzie, Hartford, Conn.

**1909.**
Jan. 10. — Rev. A. P. Reccord, Springfield.
Jan. 24. — Rev. Lyman P. Powell, Northampton.
Feb. 14. — President George Harris, Amherst.
Feb. 21. — Rev. E. M. Antrim, Springfield.
Feb. 28. — Mr. Carl Hamilton, Andover.
Mar. 7. — Mr. W. E. Tinker, New York, N. Y.
Mar. 14. — Rev. J. Ross Stevenson, New York, N. Y.
Mar. 21. — President W. E. Huntington, Boston.
Sept. 26. — Mr. A. F. Burgess, Holyoke.
Oct. 3. — Hon. George H. Utter, Westerly, R. I.
Oct. 10. — Mr. Owen R. Lovejoy, New York, N. Y.
Oct. 17. — Hon. A. T. Sweeney, Newark, N. J.
Oct. 24. — Mr. Robert A. Woods, Boston.
Oct. 31. — Mr. Ray Stannard Baker, East Lansing, Mich.
Nov. 7. — Mr. Charles W. Birtwell, Boston.
Nov. 14. — Mr. Harry W. Arnold, New York, N. Y.
Nov. 21. — Mr. John R. Boardman, New York, N. Y.

### *Speakers at Wednesday Assemblies for Year ending Nov. 30, 1909.*

**1909.**
Jan. 20. — Prof. George B. Churchill, Amherst.
Jan. 27. — Rev. Thomas Van Ness, Boston.
Feb. 17. — Rev. Clarence F. Swift, Fall River.
Mar. 3. — Hon. F. H. Jackson, Providence, R. I.
Mar. 10. — Prof. W. T. Sedgwick, M. I. T., Boston.
Apr. 28. — Mr. A. E. Winship, Boston.
May 5. — Mr. J. Horace McFarland, Harrisburg, Pa.
May 12. — Mr. James L. Tryon, Boston.
May 19. — Mr. James H. Critchett, M. I. T., Boston.
Oct. 13. — President George C. Creelman, Guelph, Ont.
Oct. 20. — Hon. Frank A. Hosmer, Amherst.
Oct. 27. — Hon. Robert D. Luce, Boston.
Nov. 3. — Mr. C. J. Blanchard, Washington, D. C.
Nov. 17. — Mr. George W. Cable, Northampton.

## TABLE IV. — *Statistics of Freshmen entering College in September, 1909.*

### *Home Addresses (classified by Towns).*

| | | | | | |
|---|---|---|---|---|---|
| Abington, | 1 | Brockton, | 2 | Concord, | 1 |
| Amherst, | 4 | Brooklyn, N. Y., | 1 | Dalton, | 1 |
| Baldwinsville, | 1 | Bryantville, | 1 | Deerfield, | 1 |
| Belchertown, | 1 | Campello, | 2 | East Dover, Vt., | 1 |
| Beverly, | 2 | Charlestown, | 1 | Easthampton | 1 |
| Bolton, | 2 | Chicopee Falls, | 3 | East Leverett, | 1 |
| Boston, | 7 | Clayton, Ill., | 1 | East Pepperell, | 1 |
| Bournedale, | 1 | Clifton, | 1 | Enfield, | 1 |
| Bridgeport, Ct., | 2 | Cochituate, | 1 | Everett, | 1 |

TABLE IV. — *Statistics of Freshmen entering College in September, 1909* — Continued.

*Home Addresses (classified by Towns)* — Concluded.

| | | | | | |
|---|---|---|---|---|---|
| Fall River, | 3 | Monson, | 1 | Shanghai, China, | 1 |
| Fitchburg, | 1 | Mount Vernon, N. Y., | 1 | Somerville, | 4 |
| Franklin, | 1 | Needham, | 2 | South Byfield, | 1 |
| Grand Isle, Vt., | 1 | New Bedford, | 2 | South Framingham, | 2 |
| Greenwich Village, | 1 | Newburyport, | 1 | South Hadley Falls, | 2 |
| Greenwood, | 1 | New York, N. Y., | 1 | South Lincoln, | 1 |
| Groton, | 1 | North Abington, | 1 | South Norwalk, Ct., | 1 |
| Hanover, | 1 | Northampton, | 1 | Swanton, Vt., | 1 |
| Harwichport, | 1 | North Truro, | 1 | Taunton, | 1 |
| Hatfield, | 1 | Palmer, | 1 | Wayland, | 2 |
| Hyde Park, | 1 | Peabody, | 1 | Wellesley, | 1 |
| Jamaica Plain, | 3 | Pelham, N. H., | 1 | Westborough, | 1 |
| Jefferson, | 1 | Richmond Hill, N. Y., | 1 | West Bridgewater, | 2 |
| Lawrence, | 1 | Roslindale, | 1 | West Chesterfield, | 1 |
| Leominster, | 1 | Roxbury, | 2 | Westford, | 1 |
| Lynn, | 4 | Rutherford, N. J., | 4 | Wethersfield, Ct., | 1 |
| Marlborough, | 1 | Rutland, | 3 | Weymouth, | 1 |
| Mattapan | 1 | Salem, | 1 | Wilbraham, | 1 |
| Meriden, Ct., | 1 | Saxonville, | 1 | Wollaston, | 3 |
| Millbury, | 1 | Selbyville, Del., | 1 | Worcester, | 5 |

*Home Addresses (classified by States).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| China, | 1 | .8 | New Jersey, | 4 | 3.0 |
| Connecticut, | 5 | 3.8 | New York, | 4 | 3.0 |
| Delaware, | 1 | .8 | Vermont, | 3 | 2.3 |
| Illinois, | 1 | .8 | | | |
| Massachusetts, | 111 | 84.7 | | 131 | 100.0 |
| New Hampshire, | 1 | .8 | | | |

*Home Addresses (classified by Counties of Massachusetts).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| Barnstable, | 3 | 2.3 | Middlesex, | 13 | 10.0 |
| Berkshire, | 1 | .8 | Nantucket, | – | – |
| Bristol, | 6 | 4.6 | Norfolk, | 9 | 6.9 |
| Dukes, | – | – | Plymouth, | 10 | 7.7 |
| Essex, | 12 | 9.2 | Suffolk, | 20 | 14.4 |
| Franklin, | 2 | 1.5 | Worcester, | 16 | 12.2 |
| Hampden, | 6 | 4.6 | | | |
| Hampshire, | 13 | 10.0 | | 111 | 84.2 |

*Intended Vocation.*

| VOCATIONS. | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture (technical), | 80 | 61.0 |
| Agriculture and horticulture (professional), | 12 | 9.2 |
| Engineering, | 2 | 1.5 |
| Professions, | 3 | 2.3 |
| Miscellaneous, | 1 | .8 |
| Undecided, | 33 | 25.2 |
| | 131 | 100.0 |

### TABLE IV. — *Statistics of Freshmen entering College in September, 1909* — Concluded.

*Education of Fathers.*

| | Number. | Per Cent. |
|---|---|---|
| Common school, | 68 | 51.9 |
| High school, | 34 | 26.0 |
| Business school, | 7 | 5.3 |
| College, | 15 | 11.4 |
| Deceased (no statistics), | 7 | 5.3 |
| | 131 | 99.9 |

*Occupation of Fathers.*

| OCCUPATIONS. | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture, | 28 | 21.4 |
| Artisans, | 29 | 22.1 |
| Business, | 24 | 18.5 |
| Deceased, | 19 | 14.5 |
| Miscellaneous, | 15 | 11.4 |
| Professional, | 12 | 9.2 |
| Retired, | 4 | 3.0 |
| | 131 | 100.1 |

*Religious Census.*

| DENOMINATION. | MEMBERSHIP. | | PREFERENCE. | | TOTALS. | |
|---|---|---|---|---|---|---|
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. |
| Baptist, | 4 | 3.0 | 5 | 3.8 | 9 | 6.8 |
| Catholic, | 14 | 10.7 | – | – | 14 | 10.7 |
| Congregational, | 26 | 20.0 | 24 | 18.5 | 50 | 38.5 |
| Episcopal, | 5 | 3.8 | 3 | 2.3 | 8 | 6.1 |
| Methodist, | 8 | 6.1 | 7 | 5.3 | 15 | 11.4 |
| Miscellaneous, | 5 | 3.8 | 8 | 6.1 | 13 | 9.9 |
| Unitarian, | 4 | 3.0 | 10 | 7.7 | 14 | 10.7 |
| Presbyterian, | 1 | .8 | 2 | 1.5 | 3 | 2.3 |
| Universalist, | 2 | 1.5 | 3 | 2.3 | 5 | 3.8 |
| Totals, | 69 | 52.7 | 62 | 47.5 | 131 | 100.2 |

*Miscellaneous Statistics.*

| | |
|---|---|
| Average age, | 18.96 years. |
| Number applying for student labor, | 89; 68 per cent. |
| Number boarding at Draper Hall, | 106; 81 per cent. |

## GIFTS AND LOANS, 1909.

### GIFTS.

Dr. John C. Cutter, an alumnus of the college, who died in August, 1909, bequeathed $1,000 to the Massachusetts Agricultural College, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene.

#### *Division of Agriculture.*

QUAKER OATS COMPANY, Chicago, Ill., 1 bag Schumacher calf meal, and feed samples for class use.

ROTO SALT COMPANY, Brooklyn, N. Y., 4 Roto salt cakes, 2 Roto feeders.

HUMANE HORSE COLLAR COMPANY, Chicago Heights, Ill., 1 Humane horse collar.

E. I. DU PONT DE NEMOURS POWDER COMPANY, Wilmington, Del., 50 pounds dynamite.

E. F. SCHLICHTER COMPANY, Philadelphia, Pa., model of silo door.

CREAMERY PACKAGE MANUFACTURING COMPANY, Albany, N. Y., samples of sanitary milk piping and sanitary valves; one steam gauge.

WASHBURN-CROSBY COMPANY, Minneapolis, Minn., exhibit illustrating milling of flour, by-products, etc.

CORN PRODUCTS REFINING COMPANY, Chicago, Ill., exhibit illustrating products obtained from corn.

GERMAN KALI WORKS, 93 Nassau Street, New York, N. Y., lantern slides exhibiting potash industry.

SINGLE SERVICE PACKAGE CORPORATION, 71 Broadway, New York, N. Y., 12 Single Service pint milk bottles.

J. W. BILES COMPANY, Cincinnati, O., exhibition samples of Ubiko horse feed, Biles union grains, together with samples of each ingredient of which the two feeds are composed.

AMERICAN LINSEED COMPANY, Chicago, Ill., exhibition samples of flaxseed by-products.

J. LINDSAY WELLS COMPANY, Memphis, Tenn., exhibition samples of various feed products in cotton seed.

CHAPIN & CO., Buffalo, N. Y., feed samples for class use.

CORN PRODUCTS MANUFACTURING COMPANY, Chicago, Ill., feed samples for class use.

NORTHWEST MILLS COMPANY, Winona, Minn., feed samples for class use.

CONTINENTAL CEREAL COMPANY, Peoria, Ill., feed samples for class use.

AMERICAN MILLING COMPANY, Chicago, Ill., feed samples for class use.

## LOANS.

D. H. BURRELL & CO., Little Falls, N. Y., Simplex No. 1 hand separator.

INTERNATIONAL HARVESTER COMPANY, Boston, Dairy Queen No. 2 hand separator.

VERMONT FARM MACHINE COMPANY, Bellows Falls, Vt., U. S. No. 14 power separator; U. S. No. 15 hand separator.

SHARPLES SEPARATOR COMPANY, No. 4 hand separator; No. 26 tubular steam turbine separator.

NATIONAL DAIRY MACHINE COMPANY, Goshen, Ind., hand separator.

DE LAVAL SEPARATOR CO., New York, N. Y., No. 20 steam turbine separator; No. 15 hand separator.

## GIFTS AND LOANS TO MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

### *Gifts.*

GERMAN KALI WORKS, 93 Nassau Street, New York, N. Y., 200 pounds kainit; 800 pounds high grade sulfate of potash; 3,800 pounds low grade sulfate of potash; 2,700 pounds muriate of potash.

Mr. A. B. LYMAN, Excelsior, Minn., 2 pounds Grimm alfalfa seed.

STERLING CHEMICAL COMPANY, Cambridgeport, patented poultry remedy.

Dr. REICHE NITRAGIN COMPANY, Milwaukee, Wis., 1 bottle Nitragin for soy beans.

JAMES J. H. GREGORY, Marblehead, 1 packet Japan millet.

Mr. W. H. BOWKER, 43 Chatham Street, Boston, 300 pounds sulfate of magnesia.

TWENTIETH CENTURY SPECIALTY COMPANY, 37 Portland Street, Boston, 25 pounds fine granitic rock; 25 pounds superfine granitic rock.

W. ATLEE BURPEE, Philadelphia, Pa., novelties in vegetable and flower seeds.

EDWARD J. WALTER COMPANY, Baltimore, Md., 200 pounds (1 drum) nitrate of lime.

GOULDS MANUFACTURING COMPANY, Seneca Falls, N. Y., 1 handy knapsack sprayer and attachments.

### *Loans.*

CHAS. A. CYPHERS, Buffalo, N. Y., 1 incubator.

# REPORT OF THE TREASURER

## FOR THE FISCAL YEAR ENDING NOV. 30, 1909.

### BALANCE SHEET.

| | | | Dr. | Cr. |
|---|---|---|---|---|
| **1908.** | | | | |
| Dec. 1. | To cash on hand, | | $1,817 75 | – |
| | By First National Bank (overdraft), | | – | $3,787 17 |
| **1909.** | | | | |
| Nov. 30. | To special appropriation receipts, State Treasurer, | | 105,664 24 | – |
| | By special appropriation disbursements, | | – | 90,093 08 |
| | To experiment station receipts, | | 57,327 69 | – |
| | From State Treasurer, | $13,125 00 | | |
| | From United States Treasurer, | 27,000 00 | | |
| | From other sources, | 17,202 69 | | |
| | By experiment station disbursements, | | – | 55,925 71 |
| | To current accounts receipts, | | 161,674 18 | – |
| | From U. S. Treasurer, Morrill fund, | $16,666 67 | | |
| | From U. S. Treasurer, Nelson fund, | 10,000 00 | | |
| | From State Treasurer, endowment fund, | 10,613 32 | | |
| | From State Treasurer, maintenance, | 15,000 00 | | |
| | From State Treasurer, scholarship, | 18,750 00 | | |
| | From State Treasurer, instruction, | 35,750 00 | | |
| | From State Treasurer, short courses, | 6,250 00 | | |
| | From State Treasurer, normal, | 6,250 00 | | |
| | From State Treasurer, veterinary, | 1,250 00 | | |
| | From State Treasurer, heat and light, | 625 00 | | |
| | From other sources, | 40,519 19 | | |
| | By current accounts disbursements, | | – | 161,792 42 |
| | To student trust funds receipts, | | 45,731 53 | – |
| | By student trust funds disbursements, | | – | 45,696 59 |
| | By cash on hand, | | – | 4,106 58 |
| | By cash on deposit, | | – | 10,813 84 |
| | | | $372,215 39 | $372,215 39 |

| | Balance Sheet, Dec. 1, 1908. | | Transactions, Dec. 1, 1908, to Nov. 30, 1909. | | Balance Sheet, Nov. 30, 1909. | |
|---|---|---|---|---|---|---|
| | Dr. | Cr. | Dr. | Cr. | Dr. | Cr. |
| Cash on hand, | $1,817 75 | – | – | $2,288 83 | $4,106 58 | – |
| Cash on deposit, | – | $3,787 17 | – | 14,601 01 | 10,813 84 | – |
| Experiment station, | – | 5,280 80 | $57,327 69 | 55,925 71 | – | $6,682 68 |
| Special appropriation, | 18,960 30 | – | 105,664 24 | 90,093 08 | 1,866 12 | – |
| Trust funds, | 1,650 97 | – | 45,731 53 | 45,696 59 | 1,616 03 | – |
| Current accounts, | – | 13,361 05 | 161,674 18 | 161,792 42 | – | 11,719 89 |
| Totals, | $22,429 02 | $22,429 02 | $370,397 64 | $370,397 64 | $18,402 57 | $18,402 57 |

## STATEMENT OF THE FIRST NATIONAL BANK WITH THE MASSACHUSETTS AGRICULTURAL COLLEGE.

| | | Dr. | Cr. |
|---|---|---|---|
| **1908.** | | | |
| Dec. 1. | Balance on hand, | $11,191 59[1] | – |
| **1909.** | | | |
| Nov. 30 | Deposits, | 385,549 23 | – |
| | Interest, | 406 73 | – |
| | Disbursements as per warrants paid, | – | $371,161 29 |
| | Balance on hand, | – | 25,986 26[1] |
| | | $397,147 55 | $397,147 55 |

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[1] These amounts are greater Dec. 1, 1908, by $14,978.76, and Nov. 30, 1909, by $15,172.42, on account of outstanding drafts.

## STATEMENT OF SPECIAL APPROPRIATION ACCOUNTS.

| NAME OF APPROPRIATION. | Date. | Total Appropriation. | Amount expended to Date. | Balance unexpended Nov. 30, 1909. |
|---|---|---|---|---|
| Clark Hall equipment, | 1907 | $24,400 00 | $24,400 00 | – |
| Dairy equipment, | 1907 | 3,000 00 | 3,000 00 | – |
| Live stock, | 1907 | 4,000 00 | 4,000 00 | – |
| Omnibus, | 1907 | 14,000 00 | 14,000 00 | – |
| Experiment station, | 1908 | 4,000 00 | 4,000 00 | – |
| Glass houses and instruction building, | 1908 | 34,000 00 | 34,000 00 | – |
| Omnibus, | 1908 | 16,000 00 | 16,000 00 | – |
| North dormitory, | 1908 | 6,000 00 | 6,000 00 | – |
| Target range, | 1908 | 1,000 00 | 1,000 00 | – |
| Athletic field, | 1909 | 5,500 00 | 4,761 10 | $738 90 |
| Replacing barn, | 1909 | 30,000 00 | 22,387 48 | 7,612 52 |
| Repairs and improvements, | 1909 | 33,000 00 | 24,618 14 | 8,381 86 |
| Teaching equipment, | 1909 | 10,000 00 | 4,267 28 | 5,732 72 |
| Zoölogical building, | 1909 | 80,000 00 | 16,390 31 | 63,609 69 |
| Totals, | . . | $264,900 00 | $178,824 31 | $85,336 79 |

## CURRENT ACCOUNTS.

### *Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1, 1908, to Nov. 30, 1909. | Receipts from Dec. 1, 1908, to Nov. 30, 1909. | Apportionment for Year ending Nov. 30, 1909. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $5,041 39 | $173 15 | $5,000 00 | $131 76 |
| Agricultural, | 19,697 34 | 14,271 77 | 6,790 00 | 1,364 43 |
| Agricultural economics, | 6 95 | – | 40 00 | 33 05 |
| Botanical, | 1,320 99 | 611 90 | 325 00 | —384 09 |
| Chemical, | 3,152 00 | 1,775 82 | 2,200 00 | 823 82 |
| Dean's office, | 201 17 | – | 120 00 | —81 17 |
| Entomology, | 651 31 | 224 87 | 775 00 | 348 56 |
| English, | 372 37 | – | 120 00 | —252 37 |
| Floriculture, | 2,398 65 | 1,484 65 | 1,000 00 | 86 00 |
| Farm fire, | – | 2,469 64 | – | 2,469 64 |
| General horticulture, | 2,992 94 | 1,183 34 | 1,120 00 | —689 60 |
| Graduate school, | 397 68 | – | – | —397 68 |

## CURRENT ACCOUNTS — *Concluded.*

### *Disbursements and Receipts* — Concluded.

| ACCOUNTS. | Disbursements from Dec. 1, 1908, to Nov. 30, 1909. | Receipts from Dec. 1, 1908, to Nov. 30, 1909. | Apportionment for Year ending Nov. 30, 1909. | Balance to Credit. |
|---|---|---|---|---|
| Grounds, | $1,474 61 | $16 30 | $1,400 00 | —$58 31 |
| Library, | 3,659 38 | 422 48 | 3,025 00 | —211 90 |
| Landscape gardening, | 231 62 | 162 00 | – | —69 62 |
| General maintenance, | 33,233 15 | 10,631 33 | 17,300 00 | —4,676 82 |
| Market gardening, | 4,775 49 | 2,914 03 | 1,900 00 | 38 54 |
| Meteorology, | 65 20 | – | – | —65 20 |
| Miscellaneous, | 284 89 | 531 42 | – | 246 53 |
| Mathematics, | 251 71 | – | 300 00 | 48 29 |
| Military, | 943 75 | 126 87 | 700 00 | —116 88 |
| Normal department, | 5,204 17 | 13 90 | 5,000 00 | 1,059 73 |
| Pomology, | 2,943 64 | 1,472 29 | 1,400 00 | —71 35 |
| Physical education, | 149 77 | – | 200 00 | 50 23 |
| President's office, | 832 58 | 63 29 | 700 00 | —69 29 |
| Registrar, | 176 61 | – | 175 00 | —1 61 |
| Salaries, | 63,353 96 | – | 65,000 00 | 1,646 04 |
| Short courses, | 6,206 95 | 1,475 27 | 5,000 00 | 1,518 32 |
| Treasurer's office, | 492 18 | 24 27 | 475 00 | 7 09 |
| Veterinary, | 1,042 00 | 148 00 | 186 97[1] | 542 97 |
| Zoölogical, | 237 97 | 322 60 | 50 00 | 134 63 |
| State Treasurer: — | | | | |
| Heat and light, | – | 625 00 | – | – |
| Endowment fund, | – | 10,613 32 | – | – |
| Instruction fund, | – | 35,750 00 | – | – |
| Maintenance fund, | – | 15,000 00 | – | – |
| Scholarship fund, | – | 18,750 00 | – | – |
| Short courses, | – | 6,250 00 | – | – |
| Normal courses, | – | 6,250 00 | – | – |
| Veterinary, | – | 1,250 00 | – | – |
| United States Treasurer: — | | | | |
| Morrill fund, | – | 16,666 67 | – | – |
| Nelson fund, | – | 10,000 00 | – | – |
| Totals, | $161,792 42 | $161,674 18 | $120,301 97 | $10,549 63 |
| Balance, beginning fiscal year, Dec. 1, 1908, | – | 11,838 13 | – | —7,145 89 |
| Balance on hand, Nov. 30, 1909, | 11,719 89 | – | – | – |
| | $173,512 31 | $173,512 31 | $120,301 97 | $3,403 74 |

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[1] Balance brought forward Dec. 1, 1908.

### *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| By cash on hand Dec. 1, 1908, | – | $11,838 13 |
| By institution receipts Nov. 30, 1909, | – | 40,519 19 |
| By State Treasurer receipts Nov. 30, 1909, | – | 94,488 32 |
| By United States Treasurer receipts Nov. 30, 1909, | – | 26,666 67 |
| To total disbursements Nov. 30, 1909, | $161,792 42 | – |
| | $161,792 42 | $173,512 31 |
| Bills receivable Dec. 1, 1908, deducted, | – | 5,144 80 |
| Bills payable Dec. 1, 1908, deducted, | 3,600 35 | – |
| | $158,192 07 | $168,367 51 |
| Bills receivable Nov. 30, 1909, | – | 4,558 07 |
| Bills payable Nov. 30, 1909, | 1,724 68 | – |
| Balance, | 13,008 83 | – |
| | $172,925 58 | $172,925 58 |

*Comparative Disbursements and Receipts for 1908–09.*

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1908. | 1909. | 1908. | 1909. |
| Administration, | – | $5,041 39 | – | $173 15 |
| Agriculture, | $22,812 34 | 19,697 34 | $15,024 07 | 14,271 77 |
| Agricultural economics, | – | 6 95 | – | – |
| Botanical, | 1,156 75 | 1,320 99 | 678 60 | 611 90 |
| Chemical, | 2,773 60 | 3,152 00 | 795 04 | 1,775 82 |
| Dean's office, | 95 34 | 201 17 | – | – |
| Entomology, | 806 90 | 651 31 | 180 15 | 224 87 |
| English, | 98 71 | 372 37 | – | – |
| Floriculture, | 2,909 44 | 2,398 65 | 1,987 53 | 1,484 65 |
| Farm fire, | – | – | – | 2,469 64 |
| General horticulture, | 3,366 97 | 2,992 94 | 1,002 36 | 1,183 34 |
| Graduate school, | 68 78 | 397 68 | – | – |
| Grounds, | – | 1,474 61 | – | 16 30 |
| Library, | 2,411 64 | 3,659 38 | 634 38 | 422 48 |
| Landscape gardening, | 127 04 | 231 62 | 163 30 | 162 00 |
| General maintenance, | 23,944 90 | 33,518 04 | 9,418 55 | 11,162 75 |
| Market gardening, | 3,668 47 | 4,775 49 | 1,748 74 | 2,914 03 |
| Meteorology, | 248 05 | 65 20 | – | – |
| Miscellaneous, | 5,000 00 | – | 5,000 00 | – |
| Mathematics, | 194 74 | 251 71 | – | – |
| Military, | 382 89 | 943 75 | 25 00 | 126 87 |
| Normal department, | 6,061 08 | 5,204 17 | 773 09 | 13 90 |
| Pomology, | 1,507 93 | 2,943 64 | 1,061 21 | 1,472 29 |
| Physical education, | – | 149 77 | – | – |
| President's office, | 3,294 65 | 832 58 | 28 01 | 63 29 |
| Registrar, | 97 40 | 176 61 | – | – |
| Salaries, | 50,380 19 | 63,353 96 | 208 33 | – |
| Short courses, | – | 6,206 95 | – | 1,475 27 |
| Treasurer's office, | 611 81 | 492 18 | 44 07 | 24 27 |
| Veterinary, | 1,747 30 | 1,042 00 | 1,015 02 | 148 00 |
| Zoölogical, | 382 79 | 237 97 | 191 80 | 322 60 |
| State Treasurer: — | | | | |
| Heat and light, | – | – | – | 625 00 |
| Endowment fund, | – | – | 10,613 32 | 10,613 32 |
| Instruction fund, | – | – | 21,500 00 | 35,750 00 |
| Maintenance fund, | – | – | 11,500 00 | 15,000 00 |
| Scholarship fund, | – | – | 15,000 00 | 18,750 00 |
| Short courses, | – | – | 3,750 00 | 6,250 00 |
| Normal courses, | – | – | 3,750 00 | 6,250 00 |
| Veterinary, | – | – | – | 1,250 00 |
| Deficit appropriation, | – | – | 13,739 17 | – |
| United States Treasurer: — | | | | |
| Morrill fund, | – | – | 16,666 67 | 16,666 67 |
| Nelson fund, | – | – | 6,666 66 | 10,000 00 |
| | $134,149 71 | $161,792 42 | $143,165 07 | $161,674 18 |
| Balance at beginning of fiscal year, | – | – | 2,807 70 | 11,838 13 |
| Balance at close, | 11,823 06 | 11,719 89 | – | – |
| | $145,972 77 | $173,512 31 | $145,972 77 | $173,512 31 |

## Experiment Station.

### *Disbursements and Receipts.*

| Accounts. | Disbursements from Dec. 1, 1908, to Nov. 30, 1909. | Receipts from Dec. 1, 1908, to Nov. 30, 1909. | Apportionment for Year ending Nov. 30, 1909. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $2,065 20 | $47 35 | $1,845 90 | —$171 95 |
| Agricultural, | 4,578 09 | 2,010 46 | 2,411 05 | —156 58 |
| Asparagus, | 715 60 | – | 655 68 | —59 92 |
| Botanical, | 1,617 96 | 44 13 | 1,061 37 | —512 46 |
| Chemical, | 10,365 83 | 4,809 38 | 4,385 66 | —1,170 79 |
| Cranberry, | 459 56 | – | 1,871 88 | 1,412 32 |
| Entomology, | 495 58 | – | 711 21 | 215 63 |
| Fertilizer, | – | 5,505 00 | – | 5,505 00 |
| Freight, | 499 91 | 15 29 | 319 08 | —165 54 |
| Graves orchard, | 281 10 | – | 596 26 | 315 16 |
| Horticultural, | 1,719 44 | 1 15 | 1,432 43 | —285 86 |
| Library, | 343 11 | 8 87 | 509 06 | 174 82 |
| Meteorology, | 308 05 | – | 276 76 | —31 29 |
| Publications, | 2,031 81 | 107 98 | 5,561 48 | 3,637 65 |
| Salaries, | 29,891 64 | 153 08 | 28,119 53 | —1,619 03 |
| Treasurer's office, | 319 82 | – | 378 40 | 58 58 |
| Veterinary, | 231 71 | – | 432 67 | 200 96 |
| Hatch fund, | – | 15,000 00 | – | – |
| Adams fund, | – | 12,000 00 | – | – |
| State fund, | – | 13,125 00 | – | – |
| Feed law, | – | 4,500 00 | – | – |
| Repairs, | 1 30 | – | 300 00 | – |
| Totals, | $55,925 71 | $57,327 69 | $50,868 42 | $7,346 70 |
| Balance beginning of fiscal year Dec. 1, 1908, | – | 5,280 70 | – | – |
| Balance on hand Nov. 30, 1909, | 6,682 68 | – | – | – |
|  | $62,608 39 | $62,608 39 | – | – |

### *Comparative Disbursements and Receipts for 1908–09.*

| Accounts. | Disbursements. |  | Receipts. |  |
|---|---|---|---|---|
|  | 1908. | 1909. | 1908. | 1909. |
| Administration, | $1,738 14 | $2,065 20 | $88 48 | $47 35 |
| Agricultural, | 5,193 83 | 4,578 09 | 3,235 96 | 2,010 46 |
| Asparagus, | 1,879 33 | 715 60 | – | – |
| Botanical, | 1,433 88 | 1,617 96 | 54 59 | 44 13 |
| Chemical, | 10,726 45 | 10,365 83 | 4,848 35 | 4,809 38 |
| Cranberry, | 214 06 | 459 56 | – | – |
| Entomology, | 619 57 | 495 58 | 2 00 | – |
| Fertilizer, | – | – | 5,390 00 | 5,505 00 |
| Freights, | 438 71 | 499 91 | 85 | 15 29 |
| Graves orchard, | 189 37 | 281 10 | – | – |
| Horticulture, | 925 12 | 1,719 44 | 10 00 | 1 15 |
| Library, | 159 57 | 343 11 | – | 8 87 |
| Meteorology, | 79 63 | 308 05 | – | – |
| Publications, | 2,885 45 | 2,031 81 | – | 107 98 |
| Salaries, | 25,631 32 | 29,891 64 | 75 00 | 153 08 |
| Treasurer's office, | 340 80 | 319 82 | – | – |
| Veterinary, | 195 14 | 231 71 | 6 00 | – |
| Hatch fund, | – | – | 15,000 00 | 15,000 00 |
| Adams fund, | – | – | 10,000 00 | 12,000 00 |
| State fund, | – | – | 10,500 00 | 13,125 00 |
| Feed law, | – | – | 3,000 00 | 4,500 00 |
| Repairs, | – | 1 30 | – | – |
|  | $52,650 37 | $55,925 71 | $52,211 23 | $57,327 69 |
| Balance beginning of fiscal year, | – | – | 5,719 94 | 5,280 70 |
| Balance on hand Nov. 30, 1909, | 5,280 80 | 6,682 68 | – | – |
|  | $57,931 17 | $62,608 39 | $57,931 17 | $62,608 39 |

## AGRICULTURAL DIVISION.

*Disbursements and Receipts for Fiscal Year ending Nov. 30, 1909.*

| | Disbursements. | Receipts. |
|---|---|---|
| *Academic.* | | |
| Maintenance, | $170 20 | $2 14 |
| Equipment, | 233 32 | 2 55 |
| Student labor, | 116 26 | – |
| Miscellaneous, | 8 25 | – |
| Department totals, | $528 03 | $4 69 |
| Office, | $288 30 | $48 79 |
| *Farm.* | | |
| Dairy barn, | $4,715 71 | $8,140 78 |
| Field crops, | 1,361 74 | 462 29 |
| Horses, | 1,716 05 | 1,545 09 |
| Swine, | 63 06 | 281 83 |
| Tools and implements, | 531 55 | 3 00 |
| Repairs, | 165 48 | – |
| Miscellaneous, | 161 58 | 25 |
| Fire, | 351 29 | 356 65 |
| Improvements, | 137 12 | 12 95 |
| Labor, | 8,306 05 | 3,415 45 |
| Student labor, | 1,371 38 | – |
| Department totals, | $18,881 01 | $14,218 29 |
| Division totals, | 19,697 34 | 14,271 77 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | – | $14,271 77 |
| By bills receivable, | – | 1,492 63 |
| By apportionment, | – | 6,790 00 |
| To total disbursements, | $19,697 34 | – |
| To bills payable, | 359 53 | – |
| To balance, | 2,497 53 | – |
| | $22,554 40 | $22,554 40 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1908. | Nov. 30, 1909. |
|---|---|---|
| Inventory of produce, | $2,381 00 | $3,219 93 |
| Inventory of cattle, | 5,700 49 | 8,155 00 |
| Inventory of swine, | 206 41 | 182 00 |
| Inventory of horses, | 7,005 00 | 4,375 00 |
| | $15,292 90 | $15,931 93 |

## HORTICULTURAL DIVISION.

*Disbursements and Receipts for Fiscal Year ending Nov. 30, 1909.*

| | Disbursements. | Receipts. |
|---|---|---|
| Market gardening, | $4,775 49[1] | $2,914 03 |
| General horticulture, | 2,992 94 | 1,183 34 |
| Floriculture, | 2,398 65 | 1,484 65 |
| Pomology, | 2,943 64 | 1,472 29 |
| Landscape gardening, | 231 62 | 162 00 |
| Totals, | $13,342 34 | $7,216 31 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | – | $7,216 31 |
| By bills receivable, | – | 1,142 64 |
| By apportionment, | – | 5,420 00 |
| To total division disbursements, | $13,342 34 | – |
| To total division bills payable, | 200 23 | – |
| To balance unexpended, | 236 38 | – |
| | $13,778 95 | $13,778 95 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1908. | Nov. 30, 1909. |
|---|---|---|
| Inventory of produce, | $100 00 | $410 40 |

---

[1] This amount is greater by $383.37, being amount of sales belonging to Louise Baker property and pomology department.

## INVENTORY — REAL ESTATE.

### *Land (Estimated Value).*

| | | |
|---|---|---|
| College farm, | $37,000 00 | |
| Pelham quarry, | 500 00 | |
| Bangs place, | 2,350 00 | |
| Clark place, | 4,500 00 | |
| Westcott place, | 2,250 00 | |
| Baker place, | 2,500 00 | |
| | | $49,100 00 |

### *College Buildings (Estimated Value).*

| | | |
|---|---|---|
| Drill hall, | $6,150 00 | |
| Powder house, | 75 00 | |
| Gun shed and bath room, | 2,500 00 | |
| Stone chapel, | 30,225 00 | |
| South dormitory, | 35,500 00 | |
| North dormitory, | 25,400 00 | |
| Chemical laboratory, | 8,200 00 | |
| Entomological laboratory, | 5,000 00 | |
| *Amounts carried forward,* | $113,050 00 | $49,100 00 |

| | | |
|---|---|---|
| *Amounts brought forward,* | $113,050 00 | $49,100 00 |
| Veterinary laboratory and stable, | 22,995 60 | |
| Farmhouse, | 2,050 00 | |
| Horse barn, | 5,020 00 | |
| Hay storage barn and silo, | 30,000 00 | |
| Young stock barn, | 6,500 00 | |
| Graves house and barn, | 1,560 00 | |
| Dining hall, | 35,450 00 | |
| Mathematical building, | 5,600 00 | |
| Wilder Hall, | 37,300 00 | |
| Tool house, | 2,000 00 | |
| Horticultural barn, | 2,525 00 | |
| Clark Hall, | 67,400 00 | |
| Durfee plant house and fixtures, | 10,000 00 | |
| Small plant house, with vegetable cellar and cold grapery, | 4,700 00 | |
| President's house, | 6,700 00 | |
| Dwelling houses purchased with farm, | 5,100 00 | |
| Power house, | 12,000 00 | |
| French Hall, | 17,000 00 | |
| Glass house range, | 15,000 00 | |
| | | 401,950 60 |

## *College Equipment* (*Estimated Value*).

| | | |
|---|---|---|
| Botanical department, | $7,606 77 | |
| General horticulture, | 8,713 22 | |
| Pomology, | 918 27 | |
| Market gardening, | 954 35 | |
| Floriculture, | 5,359 63 | |
| Landscape gardening, | 4,059 02 | |
| Chemical laboratory, | 3,946 84 | |
| Entomological laboratory, | 2,214 70 | |
| Zoölogical museum, | 6,486 73 | |
| Zoölogical laboratory, | 3,668 71 | |
| Veterinary laboratory, | 7,840 72 | |
| Physics and mathematics, | 5,628 80 | |
| English department, | 74 00 | |
| President's office, | 894 38 | |
| Dean's office, | 308 66 | |
| Treasurer's office, | 1,030 00 | |
| Registrar's office, | 182 00 | |
| Text-books, | 60 00 | |
| Library, | 54,422 25 | |
| Military department, | 778 70 | |
| Fire apparatus, | 623 20 | |
| Heating and lighting, | 58,613 04 | |
| Water mains, | 7,780 00 | |
| Dining hall, | 2,513 80 | |
| Normal department, | 728 42 | |
| Physical education, | 1,805 34 | |
| Short courses, | 541 00 | |
| Farm, | 22,117 05 | |
| Dairy school, | 1,649 49 | |
| Agricultural department, | 3,260 51 | |
| | | 214,779 60 |
| *Amount carried forward,* | | $665,830 20 |

| | | |
|---|---|---|
| *Amount brought forward,* | | $665,830 20 |

### *Experiment Station Buildings (Estimated Value).*

| | | |
|---|---|---|
| Agricultural laboratory, | $9,000 00 | |
| Chemical laboratory (plant and animal chemistry), | 20,000 00 | |
| Entomological laboratory, | 1,675 00 | |
| | | 30,675 00 |

### *Experiment Station Equipment (Estimated Value).*

| | | |
|---|---|---|
| Director's office, | $2,700 25 | |
| Treasurer's office, | 377 50 | |
| Agricultural laboratory, | 9,637 75 | |
| Entomological laboratory, | 21,089 40 | |
| Botanical laboratory, | 4,212 20 | |
| Chemical laboratory, | 18,577 02 | |
| Horticultural laboratory, | 537 70 | |
| Meteorology laboratory, | 1,300 80 | |
| | | 58,432 62 |
| | | $754,937 82 |

### *Inventory Summary.*

| | | |
|---|---|---|
| Land, | $49,100 00 | |
| College buildings, | 401,950 60 | |
| College equipment, | 214,779 60 | |
| Experiment station buildings, | 30,675 00 | |
| Experiment station equipment, | 58,432 62 | |
| | | $754,937 82 |

## STUDENTS' TRUST FUNDS ACCOUNTS.

| ACCOUNTS. | Disbursements for Year ending Nov. 30, 1909. | Receipts for Year ending Nov. 30, 1909. | Balance brought forward Dec. 1, 1908. | Balance on Hand Nov. 30, 1909. |
|---|---|---|---|---|
| Athletics, | $2,230 37 | $543 34 | $1,697 03 | $10 00 |
| Dining hall, | 34,840 82 | 34,073 26 | —4,890 80 | —5,658 36 |
| Louise Baker property, | – | 188 14 | – | 188 14 |
| Keys, | 29 50 | 29 00 | 34 25 | 33 75 |
| Creamery house, | 60 96 | 85 50 | – | 24 54 |
| Students' deposits, | 4,165 50 | 4,181 28 | 455 60 | 471 38 |
| College signal, | 341 75 | 674 95 | – | 333 20 |
| Trophy room tax, | 304 01 | 493 50 | 174 76 | 364 25 |
| Harlow farm, | 87 51 | 45 00 | – | —42 51 |
| Text books, | 3,542 90 | 3,818 93 | 878 19 | 1,154 22 |
| Kellogg farm, | 79 92 | 57 50 | – | —22 42 |
| Uniforms, | 13 35 | 1,541 13 | – | 1,527 78 |
| | $45,696 59 | $45,731 53 | —$4,890 80 | —$5,723 29 |
| | | | 3,239 83 | 4,107 26 |
| Balance on hand Dec. 1, 1908, | —1,650 97 | – | – | – |
| Balance on hand Nov. 30, 1909, | – | —1,616 03 | – | – |
| | $47,347 56 | $47,347 56 | —$1,650 97 | —$1,616 03 |

## DETAILED STATEMENT OF DINING HALL.

| | Liabilities. | Resources. |
|---|---|---|
| Dec. 1, 1908, cash overdraft, | $4,890 80 | – |
| Nov. 30, 1909, provisions purchased, | 34,840 82 | – |
| Nov. 30, 1909, outstanding bills, | 1,523 86 | – |
| Nov. 30, 1909, total collections, | – | $34,073 26 |
| Nov. 30, 1909, total collections outstanding, | – | 3,718 03 |
| Nov. 30, 1909, inventory, | – | 1,793 74 |
| Balance, | – | 1,670 45 |
| | $41,255 48 | $41,255 48 |

## ENDOWMENT FUND.[1]

| | Principal. | Income. |
|---|---|---|
| United States grant (5 per cent.), | $219,000 00 | $7,300 00 |
| Commonwealth grant (3½ per cent.), | 142,000 00 | 3,313 32 |
| | | $10,613 32 |

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[1] This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

## BENEFICIARY FUNDS.

### *Burnham Emergency Fund.*

| | Market Value Dec. 1, 1909. | Par Value. | Income. |
|---|---|---|---|
| Two Lake Shore & Michigan Southern Railroad gold notes, at $1,000, | $2,000 00 | $2,000 00 | $100 00 |
| Two bonds American Telegraph and Telephone Company, 4's, at $92⅜, | 1,847 50 | 2,000 00 | 80 00 |
| One bond United Fruit Company, | 1,010 00 | 1,000 00 | 50 00 |
| | $4,857 50 | $5,000 00 | $230 00 |
| Unexpended balance Dec. 1, 1908, | – | – | 242 62 |
| | | | $472 62 |
| Disbursements for prizes for fiscal year ending Nov. 30, 1909, | | | 90 00 |
| Cash on hand Dec. 1, 1909, | | | $382 62 |

### *Library Fund.*

| | | | |
|---|---|---|---|
| Five bonds Lake Shore & Michigan Southern Railroad Company 4's, at $95½, | $4,775 00 | $5,000 00 | $200 00 |
| Five bonds New York Central & Hudson River Railroad Company 4's, at $95½, | 4,775 00 | 5,000 00 | 200 00 |
| Two shares New York Central & Hudson River Railroad Company stock, at $126, | 252 00 | 200 00 | 10 00 |
| Amherst Savings Bank, deposit, | 167 77 | 167 77 | 6 68 |
| | $9,969 77 | $10,367 77 | $416 68 |
| Transferred to library account, | | | 416 68 |

## SPECIAL FUNDS.

### *Endowed Labor Fund (the Gift of a Friend of the College).*

| | Market Value Dec. 1, 1909. | Par Value. | Income. |
|---|---|---|---|
| Two bonds American Telegraph and Telephone Company 4's, at $92⅜, . . . . . . | $1,847 50 | $2,000 00 | $80 00 |
| One bond New York Central Railroad debenture 4's, | 955 00 | 1,000 00 | 40 00 |
| Two bonds Lake Shore & Michigan Southern Railroad 4's, at $95½, . . . . . . | 1,910 00 | 2,000 00 | 80 00 |
| Amherst Savings Bank, deposit, . . . . | 143 39 | 143 39 | 5 72 |
| | $4,855 89 | $5,143 39 | $205 72 |
| Unexpended balance Dec. 1, 1908, . . . . | . . . | . . . | 474 95 |
| Cash on hand Dec. 1, 1909, . . . . | . . . | . . . | $680 67 |

### *Whiting Street Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central debenture 4's, . . | $955 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, . . . . | 271 64 | 271 64 | 10 84 |
| | $1,226 64 | $1,271 64 | $50 84 |
| Unexpended balance Dec. 1, 1908, . . . . | . . . | . . . | 38 45 |
| | | | $89 29 |
| Disbursement for scholarships for fiscal year ending Nov. 30, 1909, . . . . . . . | . . . | . . . | 52 50 |
| Cash on hand Dec. 1, 1909, . . . . | . . . | . . . | $36 79 |

### *Hills Fund.*

| | | | |
|---|---|---|---|
| Northampton Institution for Savings, deposit, . | $1,180 00 | $1,180 00 | $44 66 |
| One bond American Telegraph and Telephone Company 4's, . . . . . . . . . | 923 75 | 1,000 00 | 40 00 |
| Three American Telephone Company notes,* . . | 3,000 00 | 3,000 00 | 75 00 |
| One bond New York Central & Hudson River Railroad debentures 4's, . . . . . . . | 955 00 | 1,000 00 | 40 00 |
| One bond New York Central & Lake Shore R. R. 3½'s, | 860 00 | 1,000 00 | 35 00 |
| One bond New York Central & Hudson River Railroad gold note, 5 per cent., . . . . | 1,000 00 | 1,000 00 | 50 00 |
| One bond Metropolitan Street Railway, Kansas City, 5 per cent., . . . . . . . . | 1,000 00 | 1,000 00 | 50 00 |
| Three bonds Pacific Telephone and Telegraph Company 5's, . . . . . . . . . | 2,962 50 | 3,000 00 | 75 00 |
| Boston & Albany Railroad stocks, . . . . | 825 36 | 362 00 | 31 68 |
| Amherst Savings Bank, deposit, . . . . | 72 75 | 72 75 | 2 88 |
| | $12,779 36 | $12,614 75 | $444 22 |
| *On April 13 : —<br>Three American Telephone Company notes were sold for, . . . $3,080 42<br>Three Pacific Telephone and Telegraph bonds were purchased for, . 2,986 25<br>$94 17 | —3,000 00 | —3,000 00 | 94 17 |
| Unexpended balance Dec. 1, 1908, . . . . | – | – | 275 90 |
| | $9,779 36 | $9,614 75 | $814 29 |
| Disbursements by horticultural and botanical departments for fiscal year ending Nov. 30, 1909, . . | . . . | . . . | 434 59 |
| Cash on hand Dec. 1, 1909, . . . . | . . . | . . . | $379 70 |

## SPECIAL FUNDS — *Concluded.*

### *Mary Robinson Fund.*

| | Market Value Dec. 1, 1909. | Par Value. | Income. |
|---|---|---|---|
| Northampton Institution for Savings, deposit, | $820 00 | $820 00 | $31 04 |
| Boston & Albany Railroad stock, | 86 64 | 38 00 | 3 32 |
| | $906 64 | $858 00 | $34 36 |
| Unexpended balance Dec. 1, 1908, | | | 27 31 |
| | | | $61 67 |
| Disbursements for scholarships for fiscal year ending Nov. 30, 1909, | | | 40 50 |
| Cash on hand Dec. 1, 1909, | | | $21 17 |

### *Grinnell Prize Fund.*

| | | | |
|---|---|---|---|
| Ten shares New York Central & Hudson River Railroad stock | $1,260 00 | $1,000 00 | $50 00 |
| Unexpended balance Dec. 1, 1908, | | | 121 24 |
| | | | $171 24 |
| Disbursements for prizes, | | | 50 00 |
| Cash on hand Dec. 1, 1909, | | | $121 24 |

### *Gassett Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central debentures 4's, | $955 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank deposit, | 11 64 | 11 64 | 44 |
| | $966 64 | $1,011 64 | $40 44 |
| Unexpended balance Dec. 1, 1908, | | | 57 49 |
| | | | $97 93 |
| Disbursements for scholarships for fiscal year ending Nov. 30, 1909, | | | 64 50 |
| Cash on hand Dec. 1, 1909, | | | $33 43 |

### *Massachusetts Agricultural College (Investment).*

| | | | |
|---|---|---|---|
| One share New York Central & Hudson River Railroad stock, | $126 00 | $100 00 | $5 00 |
| Unexpended balance Dec. 1, 1908, | | | 33 00 |
| Cash on hand Dec. 1, 1909, | | | $38 00 |

### *Danforth Keyes Bangs Fund.*

| | | | |
|---|---|---|---|
| Two bonds Pacific Telephone and Telegraph Company 5's, | $1,975 00 | $2,000 00 | $50 00 |
| Two bonds American Telegraph and Telephone Company 4's, | 1,847 50 | 2,000 00 | 40 00 |
| Two bonds Union Electric Light and Power Company 5's, | 1,980 00 | 2,000 00 | 50 00 |
| | $5,802 50 | $6,000 00 | $140 00 |
| Unexpended balance, | | | 94 04 |
| Cash on hand Dec. 1, 1909, | | | $234 04 |

*Summary of Balances on Hand of the Income from Funds held in Trust by the Massachusetts Agricultural College.*

| | |
|---|---|
| Burnham emergency, | $382 62 |
| Endowed labor fund, | 680 67 |
| Whiting street scholarship, | 36 79 |
| Hills fund, | 379 70 |
| Mary Robinson fund, | 21 17 |
| Grinnell prize, | 121 24 |
| Gassett scholarship fund, | 33 43 |
| Massachusetts Agricultural College investment, | 38 00 |
| Danforth Keyes Bangs fund, | 234 04 |
| | $1,927 66 |

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the treasurer, Fred C. Kenney, for the year ending Nov. 30, 1909. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

Charles A. Gleason,
*Auditor.*

Amherst, Dec. 8, 1909.

## History of Special Funds.

| | |
|---|---|
| Burnham emergency fund: — | |
| A bequest from T. O. H. P. Burnham of Boston, made without any conditions. The trustees of the college have voted that the fund be kept intact, and that the income from it be used for the college for such purposes as they believe to be for its best interest, | $,5000 00 |
| Library fund: — | |
| The library of the college at the present time contains about 30,000 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave $2,000; Jan. 1, 1894, Charles L. Flint gave $1,000; in 1887 Elizur Smith of Lee, Mass., gave $1,215. These were the largest bequests, and amount now to | 10,000 00 |
| Endowed labor fund: — | |
| Gift of a friend of the college in 1901, income of which is to be used for the assistance of needy and deserving students, | 5,000 00 |
| Whiting Street scholarship: — | |
| Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship, | 1,000 00 |
| Hills fund: — | |
| Gift of Leonard M. and Henry F. Hills, in 1867, to establish and maintain a botanic garden, | 10,000 00 |

| | |
|---|---|
| Mary Robinson fund: — | |
| Gift of Miss Mary Robinson of Medfield, in 1874, for scholarship, | $1,000 00 |
| Grinnell prize fund: — | |
| Gift of Hon. Wm. Claflin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York, | 1,000 00 |
| Gassett scholarship fund: — | |
| Gift of Henry Gassett of Boston, the income to be used for scholarship, | 1,000 00 |
| Massachusetts Agricultural College investment fund: — | |
| Investment made by vote of trustees, in 1893; to purchase one share New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate, | 100 00 |
| Danforth Keyes Bangs fund: — | |
| Gift on account of the Louisa Baker estate, April 14, 1909, the income thereof to be used annually in aiding poor, industrious and deserving students to obtain an education in said college, | 6,000 00 |
| | $40,100 00 |

### PRIZES.

| | |
|---|---|
| Special botanical prize, the gift of Prof. A. V. Osmun, | $5 00 |
| Special prize, for best work done in entomology by undergraduates. This prize is given by the alumni entomologists, | 30 00 |
| Special prize, in honor of J. W. D. French, given by the Bay State Agricultural Society, for the best essay on forestry from the senior class, | 25 00 |
| Special prize, given by the Western Alumni Association to that member of the sophomore class who during his first two years has shown the greatest improvement in scholarship, character and example, | 25 00 |
| Special prize, the gift of Emily Williston Stearns, for the advancement of the military work of the college, | 100 00 |
| | $185 00 |

**THE M. A. C. BULLETIN**
**AMHERST, MASS.**

**Vol. II. No. 4. For May, 1910.**

**Published Six Times a Year by the College.**
**Jan., Feb., Mar., May, Sept., Oct.**

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Public Document No. 31

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# CATALOGUE

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE,

## 1909-1910.

### FORTY-SEVENTH ANNUAL REPORT.

### PART II.

BOSTON:
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1910.

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1910.

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## 1909.

### JULY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| .. | .. | .. | .. | .. | .. | .. |

### AUGUST.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### SEPTEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | **15** | **16** | **17** | **18** |
| **19** | **20** | **21** | **22** | **23** | **24** | **25** |
| **26** | **27** | **28** | **29** | **30** | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### OCTOBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | **1** | **2** |
| **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **10** | **11** | **12** | **13** | **14** | **15** | **16** |
| **17** | **18** | **19** | **20** | **21** | **22** | **23** |
| **24** | **25** | **26** | **27** | **28** | **29** | **30** |
| **31** | .. | .. | .. | .. | .. | .. |

### NOVEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | **1** | **2** | **3** | **4** | **5** | **6** |
| **7** | **8** | **9** | **10** | **11** | **12** | **13** |
| **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **21** | **22** | **23** | 24 | 25 | 26 | 27 |
| 28 | 29 | **30** | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### DECEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | **1** | **2** | **3** | **4** |
| **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **12** | **13** | **14** | **15** | **16** | **17** | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | .. |
| .. | .. | .. | .. | .. | .. | .. |

## 1910.

### JANUARY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | .. | 1 |
| 2 | 3 | **4** | **5** | **6** | **7** | **8** |
| **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **16** | **17** | **18** | **19** | **20** | **21** | **22** |
| **23** | **24** | **25** | **26** | **27** | **28** | **29** |
| **30** | **31** | .. | .. | .. | .. | .. |

### FEBRUARY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | **1** | **2** | **3** | **4** | **5** |
| **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **13** | **14** | **15** | **16** | **17** | **18** | **19** |
| **20** | **21** | 22 | **23** | **24** | **25** | **26** |
| **27** | **28** | .. | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### MARCH.

| S | M | T | W | Th | F | S |
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| .. | .. | **1** | **2** | **3** | **4** | **5** |
| **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **13** | **14** | **15** | **16** | **17** | **18** | **19** |
| **20** | **21** | **22** | **23** | **24** | **25** | 26 |
| 27 | 28 | 29 | 30 | 31 | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### APRIL.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | 1 | 2 |
| 3 | 4 | **5** | **6** | **7** | **8** | **9** |
| **10** | **11** | **12** | **13** | **14** | **15** | **16** |
| **17** | **18** | 19 | **20** | **21** | **22** | **23** |
| **24** | **25** | **26** | **27** | **28** | **29** | **30** |
| .. | .. | .. | .. | .. | .. | .. |

### MAY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| **15** | **16** | **17** | **18** | **19** | **20** | **21** |
| **22** | **23** | **24** | **25** | **26** | **27** | **28** |
| **29** | 30 | **31** | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### JUNE.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | **1** | **2** | **3** | **4** |
| **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **12** | **13** | **14** | **15** | **16** | **17** | **18** |
| **19** | **20** | **21** | **22** | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### JULY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | .. | .. | .. | .. | .. | .. |

### AUGUST.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### SEPTEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | **14** | **15** | **16** | **17** |
| **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| **25** | **26** | **27** | **28** | **29** | **30** | .. |
| .. | .. | .. | .. | .. | .. | .. |

### OCTOBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | .. | **1** |
| **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **16** | **17** | **18** | **19** | **20** | **21** | **22** |
| **23** | **24** | **25** | **26** | **27** | **28** | **29** |
| **30** | **31** | .. | .. | .. | .. | .. |

### NOVEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | **1** | **2** | **3** | **4** | **5** |
| **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **13** | **14** | **15** | **16** | **17** | **18** | **19** |
| **20** | **21** | **22** | **23** | 24 | 25 | 26 |
| 27 | **28** | **29** | **30** | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### DECEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | **1** | **2** | **3** |
| **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **11** | **12** | **13** | **14** | **15** | **16** | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| .. | .. | .. | .. | .. | .. | .. |

## 1911.

### JANUARY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| 1 | **2** | **3** | **4** | **5** | **6** | **7** |
| **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| **15** | **16** | **17** | **18** | **19** | **20** | **21** |
| **22** | **23** | **24** | **25** | **26** | **27** | **28** |
| **29** | **30** | **31** | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### FEBRUARY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | **1** | **2** | **3** | **4** |
| **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **12** | **13** | **14** | **15** | **16** | **17** | **18** |
| **19** | **20** | **21** | 22 | **23** | **24** | **25** |
| **26** | **27** | **28** | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### MARCH.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | **1** | **2** | **3** | **4** |
| **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **12** | **13** | **14** | **15** | **16** | **17** | **18** |
| **19** | **20** | **21** | **22** | **23** | **24** | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | .. |
| .. | .. | .. | .. | .. | .. | .. |

### APRIL.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | .. | 1 |
| **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **16** | **17** | **18** | 19 | **20** | **21** | **22** |
| **23** | **24** | **25** | **26** | **27** | **28** | **29** |
| **30** | .. | .. | .. | .. | .. | .. |

### MAY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | **1** | **2** | **3** | **4** | **5** | **6** |
| **7** | **8** | **9** | **10** | **11** | **12** | **13** |
| **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **21** | **22** | **23** | **24** | **25** | **26** | **27** |
| **28** | **29** | 30 | **31** | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### JUNE.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | **1** | **2** | **3** |
| **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **11** | **12** | **13** | **14** | **15** | **16** | **17** |
| **18** | **19** | **20** | **21** | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | .. |
| .. | .. | .. | .. | .. | .. | .. |

# THE MASSACHUSETTS AGRICULTURAL COLLEGE.

# Calendar.

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## Graduate School and College.

**1910.**

| | |
|---|---|
| January 3, Monday, 1 P.M., | Winter recess ends; assembly. |
| January 31, Monday, | Semester examinations begin. |
| February 7, Monday, 1 P.M., | Second semester begins; assembly. |
| February 22, Tuesday, | Washington's Birthday, holiday. |
| March 25, Friday, 6 P.M., | Spring recess begins. |
| April 4, Monday, 1 P.M., | Spring recess ends; assembly. |
| April 19, Tuesday, | Patriot's Day, holiday. |
| May 30, Monday, | Memorial Day, holiday. |
| June 6, Monday, | Senior examinations begin. |
| June 14, Tuesday, | Non-senior examinations begin. |
| June 18–22, Saturday–Wednesday, | Commencement exercises. |
| June 23–25, Thursday–Saturday, | Entrance examinations. |
| Summer vacation. | |
| September 12–14, Monday–Wednesday, | Entrance examinations. |
| September 12–14, Monday–Wednesday, | Condition examinations. |
| September 14, Wednesday, 1.30 P.M., | First semester begins; assembly. |
| November 23–28, Wednesday, 1 P.M.–Monday, 1 P.M., chapel, | Thanksgiving recess. |
| December 16, Friday, 6 P.M., | Winter recess begins. |

**1911.**

| | |
|---|---|
| January 2, Monday, 1 P.M., | Winter recess ends; chapel. |
| January 30, Monday, | Semester examinations begin. |
| February 6, Monday, 1 P.M., | Second semester begins; chapel. |
| February 22, Wednesday, | Washington's Birthday, holiday. |
| March 24, Friday, 6 P.M., | Spring recess begins. |
| April 3, Monday, 1 P.M., | Spring recess ends; chapel. |
| April 19, Wednesday, | Patriot's Day, holiday. |
| May 30, Tuesday, | Memorial Day, holiday. |
| June 5, Monday, | Senior examinations begin. |
| June 13, Tuesday, | Non-senior examinations begin. |
| June 17–21, Saturday–Wednesday, | Commencement. |
| June, | Entrance examinations. |

## Short Courses.

Summer school, begins July 11, 1910.
Ten weeks' winter course, Jan. 2–March 10, 1911.
Short poultry course, Feb. 27–March 10, 1911.
Farmers' week, March 13–17, 1911.
Beekeepers' course, May 24–June 7, 1910.
Correspondence courses, October 1–June 1.

# MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the colleges organized under the national land grant act of 1862. This act gave public lands to the several States and Territories for the establishment of colleges for the benefit of agriculture and the mechanic arts; it was framed by the late Senator Justin Smith Morrill of Vermont. For our own college, liberal appropriations are also made by the Legislature of Massachusetts.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to an entering class of 33. In January, 1875, an arrangement was made with the authorities of Boston University under which the college, without losing its independence, became the school of agriculture of the university. Under this arrangement, graduates of the Massachusetts Agricultural College may, upon certain conditions, receive the diploma in science awarded to graduates of the university. In 1882 the State experiment station was located at the college. It has since been incorporated with the college.

COURSES. — The college offers a free education to any American student who may fulfill the requirements of admission. Women are admitted on the same standing as men. Foreign students pay a tuition fee. The four-years course leads to the degree of bachelor of science, and graduate courses are given leading to the degrees of master of science and of doctor of philosophy. Winter courses of ten weeks are offered, and, upon announcement, special courses. There is also a summer school of agriculture, designed chiefly for persons desiring to teach agriculture in the elementary and high schools.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement, the term "agricultural" is used in the broadest sense. Courses are offered which give efficiency in various practical pursuits, such as general farming, dairying, the management of estates, fruit growing, glass farming, landscape gardening, forestry and arboriculture. Students also qualify for positions in institutions designed for investigation in the many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for business occupations having connection with the farm and needing expert service.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences — particularly chemistry, physics, mathematics and engineering — are an essential preparation. Still other students find the course a splendid general education, without regard to future occupation. The course is well balanced; each student is required to study English, a modern foreign language, literature, political science and history.

LOCATION AND EQUIPMENT. — Situated in the beautiful town of Amherst, the college has an inspiring outlook. The campus is especially attractive. The grounds comprise more than 400 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst, 97 miles west of Boston, is on the Central Vermont Railroad and the Central Massachusetts division of the Boston & Maine Railroad. Electric car lines connect the village with Northampton, Holyoke, Springfield and other cities. The town library is open to students, in addition to the college library, as are also good courses of lectures and concerts in the village, supplementing the various interests of college life.

# THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

# THE CORPORATION.

## MEMBERS OF THE CORPORATION.

| | TERM EXPIRES. |
|---|---|
| THOMAS L. CREELEY of Belmont, | 1911 |
| CHARLES H. PRESTON of Danvers, | 1911 |
| DAVIS R. DEWEY of Cambridge, | 1912 |
| M. FAYETTE DICKINSON of Brookline, | 1912 |
| WILLIAM H. BOWKER of Concord, | 1913 |
| GEORGE H. ELLIS of West Newton, | 1913 |
| CHARLES E. WARD of Buckland, | 1914 |
| ELMER D. HOWE of Marlborough, | 1914 |
| NATHANIEL I. BOWDITCH of Framingham, | 1915 |
| WILLIAM WHEELER of Concord, | 1915 |
| ARTHUR G. POLLARD of Lowell, | 1916 |
| CHARLES A. GLEASON of New Braintree, | 1916 |
| FRANK GERRETT of Greenfield, | 1917 |
| HAROLD L. FROST of Arlington, | 1917 |

## MEMBERS EX OFFICIO.

His Excellency Governor EBEN S. DRAPER, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
DAVID SNEDDEN, *State Commissioner of Education.*
J. LEWIS ELLSWORTH, *Secretary of the State Board of Agriculture.*

## OFFICERS OF THE CORPORATION.

His Excellency Governor EBEN S. DRAPER of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
J. LEWIS ELLSWORTH of Worcester, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

## STANDING COMMITTEES OF THE CORPORATION.[1]

### *Committee on Finance.*

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
ARTHUR G. POLLARD.
CHARLES E. WARD.
CHARLES H. PRESTON.

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[1] The president of the college is ex officio member and secretary of standing committees The director of the experiment station is a member of the committee on experiment department, without vote.

### *Committee on Course of Study and Faculty.*

William Wheeler, *Chairman.*
William H. Bowker.
M. Fayette Dickinson.
David Snedden.
Elmer D. Howe.
Davis R. Dewey.

### *Committee on Farm and Horticulture.*

#### *Farm Division.*

George H. Ellis, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
Nathaniel I. Bowditch.

#### *Horticultural Division.*

J. Lewis Ellsworth, *Chairman.*
Thomas L. Creeley.
Elmer D. Howe.
Harold L. Frost.

### *Committee on Experiment Department.*

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
Arthur G. Pollard.
Charles E. Ward.
Harold L. Frost.

### *Committee on Buildings and Arrangement of Grounds.*

M. Fayette Dickinson, *Chairman.*
William Wheeler.
Frank Gerrett.
William H. Bowker.
Nathaniel I. Bowditch.

# OFFICERS OF THE INSTITUTION.

## THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

KENYON L. BUTTERFIELD, A.M., . . . . . 25 Sunset Avenue.
President of the College and Professor of Rural Sociology.

GEORGE F. MILLS, M.A., . . . . . . 46 Amity Street.
Dean of the College, Head of the Division of the Humanities and Professor of Languages and Literature.

CHARLES H. FERNALD, Ph.D., . . . . . . 3 Hallock Street.
Director of the Graduate School and Professor of Zoölogy.

WILLIAM P. BROOKS, Ph.D., . . . Massachusetts Agricultural College.
Director of the Experiment Station and Lecturer on Soil Fertility.

WILLIAM D. HURD, M.Agr., . . . . . . 82 Pleasant Street.
Director of Short Courses.

FRANK A. WAUGH,[1] M.Sc., . . . Massachusetts Agricultural College.
Head of the Division of Horticulture and Professor of Landscape Gardening.

JAMES A. FOORD, M.Sc., . . . . . . . Nutting Avenue.
Acting Head of the Division of Agriculture and Professor of Farm Administration.

CHARLES A. GOESSMANN, Ph.D., LL.D., . . . . Amity Street.
Honorary Professor of Chemistry and Honorary Director of the Experiment Station.

CHARLES WELLINGTON, Ph.D., . . . . . 34 Amity Street.
Professor of General and Agricultural Chemistry.

JAMES B. PAIGE, B.Sc., D.V.S., . . . . . 42 Lincoln Avenue.
Professor of Veterinary Science.

GEORGE E. STONE, Ph.D., . . . . . . . Mount Pleasant.
Professor of Botany.

JOHN E. OSTRANDER, A.M., C.E., . . . . 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

HENRY T. FERNALD, Ph.D., . . . . . . . 44 Amity Street.
Professor of Entomology.

GEORGE C. MARTIN, C.E., Captain 18th U S. Infantry,
35 North Prospect Street.
Professor of Military Science and Tactics.

EDWARD A. WHITE, B.Sc., . . . . . . . Mount Pleasant.
Professor of Floriculture.

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[1] Absent on leave for second semester.

William R. Hart, A.M., . . . . . . . . 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears, M.Sc., . . . . . . . . . Mount Pleasant.
Professor of Pomology.

Philip B. Hasbrouck,[1] B.Sc., . . . . . . 130 Pleasant Street.
Associate Professor of Mathematics, Adjunct Professor of Physics and Registrar of the College.

Fred C. Kenney, . . . . . . . . . Mount Pleasant.
Treasurer.

Joseph S. Chamberlain, Ph.D., . . . . . . 6 Kellogg Avenue.
Associate Professor of Chemistry.

S. Francis Howard, M.Sc., . . . . . . . 10 Allen Street.
Assistant Professor of Chemistry.

A. Vincent Osmun, M.Sc., . . . . . . North Amherst, Mass.
Assistant Professor of Botany.

Clarence E. Gordon, B.Sc., A.M., . . . . North Amherst, Mass.
Assistant Professor of Zoölogy and Curator of the Zoölogical Museum.

Robert Wilson Neal, A.B., A.M., . . . . 7 Woodside Avenue.
Assistant Professor of English.

Percy L. Reynolds, M.D., . . . . . . 17 Fearing Street.
Assistant Professor of Physical Education and Hygiene.

William P. B. Lockwood, B.S.Agr., . . . 5 East Pleasant Street.
Assistant Professor of Dairying.

Elmer K. Eyerly, A.M., . . . . . . North Amherst, Mass.
Assistant Professor of Political Science and Lecturer in Rural Sociology.

Frank W. Rane, M.Sc., . . . . . . . . Boston, Mass.
Lecturer in Forestry.

Robert W. Lyman, B.Sc., LL.B., . . . . Northampton, Mass.
Lecturer on Farm Law.

George N. Holcomb, A.B., S.T.B., . . . . . Montague, Mass.
Lecturer in History.

Sidney B. Haskell, B.Sc., . . . . . . . . 5 Fearing Street.
Instructor in Agronomy.

Harold F. Tompson,[2] B.Sc., . . Massachusetts Agricultural College.
Instructor in Market Gardening.

Ray L. Gribben, B.S.Agr., . . . . . . . 66 Pleasant Street.
Instructor in Animal Husbandry.

Floyd B. Jenks, B.S.Agr., . . . . . . . 97 Pleasant Street.
Instructor in Agricultural Education.

Edgar L. Ashley, A.M., . . . . . . . 12 Lincoln Avenue.
Instructor in German.

Anderson Mackimmie, A.B., . . . . . North Amherst, Mass.
Instructor in French and Spanish.

C. Robert Duncan, B.Sc., . . . . . . . 46 Pleasant Street.
Instructor in Mathematics and Physics.

Charles R. Green, B.Agr., . . . . . . . Mount Pleasant.
Librarian.

Alexander E. Cance, Ph.D., . . . . . . . 9 Fearing Street.
Instructor in Agricultural Economics.

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[1] Absent on leave; classes taught by Prof. Joseph O. Thompson of Amherst College

[2] Resigned; succeeded at close of first semester by Charles S. Heller.

Frederick B. McKay, A.B., . . . . . . 12 Cottage Street.
Instructor in English and Public Speaking.
Harry M. Jennison, B.Sc., . . . . . 66 Pleasant Street.
Assistant in Botany.
John Noyes, B.Sc., . . . . . . . . Wilder Hall.
Assistant in Landscape Gardening.
John N. Summers, B.Sc., . . . . . . 66 Pleasant Street.
Assistant in Entomology.

## Graduate Assistants.

John R. Parker, B.Sc., . . . . . . 96 Pleasant Street.
Assistant in Entomology and Pomology.

## Other College Officers.

Edwin H. Forristall, M.Sc., . . Massachusetts Agricultural College.
Farm Superintendent.
Ralph J. Watts, B.Sc., . . . . . . . 9 Fearing Street.
Secretary to the President.
Charles H. White, B.Sc., . . . . . . 84 Pleasant Street.
Field Agent.
Newton Wallace, . . . . . . . . 6 Phillips Street.
Electrician.
Clarence A. Jewett, . . . . . . . 112 Pleasant Street.
Superintendent of Buildings.
James Whiting, . . . . . . . . . Hallock Street.
Foreman, Department of Floriculture.
Burke Hough, . . . . . Massachusetts Agricultural College.
Purchasing Agent.
Miss Mary E. Caldwell, . . . . . . . Draper Hall.
Bookkeeper, Treasurer's Office.
Miss Clara L. Stuart, . . . . . . . Draper Hall.
Correspondence Clerk.
Miss Henrietta Webster, . . . . . . 79 Pleasant Street.
Clerk, Treasurer's Office.
Miss Gertrude E. Warner, . . . . . . . Draper Hall.
Stenographer, Division of Agriculture.
Miss Ruth G. Smith, . . . . . . . North Amherst, Mass.
Clerk to the Dean and the Registrar.
Miss Ola H. Perrin, . . . . . . . . Draper Hall.
Clerk to the Director of Short Courses.
Miss Helen Granger, . . . . . . . . Draper Hall.
Stenographer, Division of Horticulture.

## Additional Instructors for the Summer School, 1909.

Edward Avis of New York City, Bird Life.

## Additional Instructors for the Winter School, 1910.

F. E. Van Horn, Instructor in Butter Making.
J. W. Wellman, Instructor in the Use of Separators.

# OFFICERS OF THE EXPERIMENT STATION.

Charles A. Goessmann, Ph.D., LL.D., . . . . . Amity Street.
Honorary Director and Expert Consulting Chemist.
William P. Brooks, Ph.D., . . Massachusetts Agricultural College.
Director.
Joseph B. Lindsey, Ph.D., . . . . . . 47 Lincoln Avenue.
Vice-Director.
Fred C. Kenney, . . . . . . . . . Mount Pleasant.
Treasurer.
Charles R. Green, B.Agr., . . . . . . . Mount Pleasant.
Librarian.

## DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

Joseph B. Lindsey, Ph.D., . . . . . . 47 Lincoln Avenue.
Chemist.
Edward B. Holland, M.Sc., . . . . . 28 North Prospect Street.
Associate Chemist, in charge of Research Division.
Henri D. Haskins, B.Sc., . . . . . . 87 Pleasant Street.
In charge of Fertilizer Division.
Philip H. Smith, B.Sc., . . . . . . . 102 Main Street.
In charge of Feed and Dairy Division.
Roy F. Gaskill, . . . . . Massachusetts Agricultural College.
Assistant in Animal Nutrition.
Lewell S. Walker, B.Sc., . . . . . . . 19 Phillips Street.
Assistant.
James C. Reed, B.Sc., . . . . . . . 19 Phillips Street.
Assistant.
Carl D. Kennedy, B.Sc., . . . . . . 120 Pleasant Street.
Assistant.
Joseph F. Merrill, B.Sc., . . . . . North Prospect Street.
Assistant.
Fred W. Morse, Ph.D., . . . . . North Prospect Street.
Assistant Research Chemist.
Joseph P. Howard, . . . . . . . . North Amherst, Mass.
Collector.
Harry J. Allen, . . . . . . . . . Amherst, Mass.
Assistant.

## DEPARTMENT OF AGRICULTURE.

William P. Brooks, Ph.D., . . Massachusetts Agricultural College.
Agriculturist.
H. J. Franklin, Ph.D., . . . . . . 56 Pleasant Street.
In charge of Cranberry Investigation.

ERWIN S. FULTON, B.Sc., . . . . . . North Amherst, Mass.
First Assistant Agriculturist.
EDWIN F. GASKILL, B.Sc., . . . . . . . Mr. Goldberg's.
Second Assistant Agriculturist.

## DEPARTMENT OF HORTICULTURE.

FRANK A. WAUGH, M.Sc., . . . Massachusetts Agricultural College.
Horticulturist.
FRED C. SEARS, M.Sc., . . . . . . . . Mount Pleasant.
Pomologist.
JACOB K. SHAW, M.Sc., . . . . . . . 1 Allen Street.
Assistant Horticulturist.

## DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

GEORGE E. STONE, Ph.D., . . . . . . . Mount Pleasant.
Botanist and Vegetable Pathologist.
GEORGE H. CHAPMAN, B.Sc., . . . . . 13 Fearing Street.
Assistant Botanist.

## DEPARTMENT OF ENTOMOLOGY.

CHARLES H. FERNALD, Ph.D., . . . . . . 3 Hallock Street.
Entomologist.
HENRY T. FERNALD, Ph.D., . . . . . . . 44 Amity Street.
Associate Entomologist.
JOHN N. SUMMERS, B.Sc., . . . . . . 66 Pleasant Street.
Assistant Entomologist.

## DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., . . . . . . 42 Lincoln Avenue.
Veterinarian.

## DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., . . . . 35 North Prospect Street.
Meteorologist.
CHARLES M. DAMON, . . . . Massachusetts Agricultural College.
Observer.

## OTHER OFFICERS OF THE EXPERIMENT STATION.

Miss ROSE J. BROWN, . . . . . . . . Draper Hall.
Secretary to the Director.
Miss JESSIE V. CROCKER, . . . . . . Sunderland, Mass.
Stenographer, Department of Botany and Vegetable Pathology.
Miss HARRIET COBB, . . . . . . . 33 Cottage Street.
Stenographer, Department of Plant and Animal Chemistry.
Miss BRIDIE O'DONNELL, . . . . . . . Amherst, Mass.
Stenographer, Department of Entomology.

# COMMITTEES OF THE FACULTY.[1]

## 1909-10.

### INSTRUCTION.

Professor MILLS.
Professor WELLINGTON.
Professor OSTRANDER.
Professor SEARS.
Professor HART.
Professor FOORD.

### ENTRANCE EXAMINATIONS AND ADMISSION.

The REGISTRAR.
Assistant Professor HOWARD.
Assistant Professor GORDON.
Assistant Professor NEAL.
Mr. MACKIMMIE.

### STUDENT ACTIVITIES.

The DEAN.
Professor STONE.
Captain MARTIN.
Professor WHITE.
Mr. GRIBBEN.

### SCHEDULE.

### ATHLETICS.

Professor PAIGE.
Assistant Professor REYNOLDS.
Assistant Professor GORDON.

### GRADUATE SCHOOL.

Professor C. H. FERNALD.
Professor WELLINGTON.
Professor STONE.
Professor SEARS.
Professor H. T. FERNALD.
Professor MILLS.

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[1] The President is ex officio a member of standing committees.

## CATALOGUE AND OTHER PUBLICATIONS.

Assistant Professor NEAL.
Assistant Professor OSMUN.
Assistant Professor EYERLY.

## LIBRARY.

Professor STONE.
Professor BROOKS.
Professor H. T. FERNALD.

## ADVISORY COMMITTEE ON STUDENT LABOR.

The TREASURER.
The DEAN.
The REGISTRAR.

## ADVISORY COMMITTEE ON DISCIPLINE.

The DEAN.
The TREASURER.
The REGISTRAR.
The COMMANDANT.

# THE COLLEGE.

# ADMISSION.

## A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. If an applicant desires a free State scholarship, he must also present to the registrar a certificate of appointment from the State senator of his district. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

## B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be satisfied by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.

2. By presenting certificate from any school approved by the college entrance examination boards.

3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present at least three of the six required subjects for admission, and not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. A candidate deficient in both algebra and plane geometry will not be admitted. For the fall of 1910 conditions to the amount of two and one-half units will be allowed; for the fall of 1911 and the following years conditions to the amount of two units will be allowed.[1]

*Places of Examination.* — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall; in Pittsfield, in the City Hall.

In September of each year: in Amherst only, in the building of the Department of Mathematics, Massachusetts Agricultural College.

*Time Schedule for Examinations, 1910.* — The examinations for entrance in 1910 will be held on the following dates: —

In June, Thursday, June 23, to Saturday, June 25.

In September, Monday, September 12, to Wednesday, September 14.

*First Day.*

| | |
|---|---|
| 8.15 A.M. | Registration. |
| 8.30 A.M. | Plane geometry. |
| 10.15 A.M. | Chemistry. |
| 11.15 A.M. | Physics. |
| 1.45 P.M. | United States history and civics. |
| 2.45 P.M. | French or German, both required and elective. |

*Second Day.*

| | |
|---|---|
| 8.15 A.M. | English, required and elective. |
| 1.30 P.M. | Algebra. |
| 3.15 P.M. | History, both required and elective. |

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[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units (in 1910, two and one-half units) of the preparatory subjects, applicants may be admitted, upon examination, with a condition in English under these restrictions: (1) The parts of the preparatory study in English to be valued in entrance units approximately as follows: (*a*) composition, etc., one and one-quarter units; (*b*) reading and study (including interpretation, three-quarters of a unit; see p. 28), one and three quarters units; total, 3 units. (2) The applicant to show, upon examination, satisfactory preparation in work amounting to not less than two units.

The purpose of this provision is to avoid the possible injustice of excluding, without further trial, applicants who appear to be deficient in preparation in only one subject; and the examination will be so set as to permit the estimating of separate credits to carry out this purpose.

Attention is called to the standing rule of the uniform entrance requirement bodies concerning English as an admission subject; namely, that applicants whose work is seriously lacking in correct spelling, punctuation, grammar or other elementary essentials of good usage will be rejected.

### *Third Day.*

8.15 A.M. to 12.15 P.M. In this period, all elective subjects not already scheduled must be taken. Candidates taking these subjects will report at 8.15, and remain in the examination room until all subjects in which they desire examination have been taken. Candidates for examination in either Greek or Latin must, not later than June 1, notify the registrar of their intention to present themselves.

## C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of five recitations a week for a school year. Fourteen units must be offered for admission, of which nine are required and five are elective.

(*a*) The following nine units are required: —

| | |
|---|---|
| ***Language.*** | |
| English, | 3 |
| French or German, | 2 |
| ***History and Civics.*** | |
| United States history and civics, | ½ |
| History (elective), | 1 |
| (*a*) Ancient history. | |
| (*b*) Medieval and modern history. | |
| (*c*) English history. | |
| (*d*) General history. | |
| ***Mathematics.*** | |
| Algebra, through progressions, | 1½ |
| Plane geometry, | 1 |

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

| | |
|---|---|
| ***Language.*** | |
| English in addition to requirements, | 1 |
| French in addition to requirements, | 2 or 1[1] |
| German in addition to requirements, | 2 or 1[1] |
| Greek, | 2 or 3 |
| Latin, | 2 or 3 |

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[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

### *History.*

| | |
|---|---|
| In addition to requirements, | 1 or 2 |

### *Mathematics, and Other Sciences.*

| | |
|---|---|
| Solid geometry, | ½ |
| Trigonometry, | ½ |
| Chemistry, | 1 |
| Physiography, | ½ |
| Physiology, | ½ |
| Agriculture,[1] | ½ or 1 |
| Botany,[1] | ½ or 1 |
| Geology,[1] | ½ |
| Physics,[1] | 1 |
| Zoölogy,[1] | ½ |
| Commercial geography,[2] | ½ |
| Drawing,[2] | ½ |
| Manual training,[2] | ½ or 1 |

**PRESENTATION OF NOTE-BOOKS.**—**In specified subjects, the keeping of note-books is required as part of the preparation. If an applicant presents a certificate in any one of these subjects, the certificate must state that the note-book has been satisfactorily prepared, but the note-book itself is not to be submitted; but if the applicant takes an examination, he must submit the note-book itself, at the same time as and as part of the examination; and note-books so presented must themselves be certified by the principal.**

## D. STATEMENT[3] OF PREPARATION REQUIRED FOR ADMISSION.

**In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address sub-station 84, New York City.**

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance

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[1] Note-books required as part of preparation in these subjects; must be presented, properly certified, at examination; must be certified to but not presented in case of admission on certificate.

[2] Certification necessary in these subjects; no examinations given.

[3] In alphabetical order by subjects.

Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half unit or the one unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

COMMERCIAL GEOGRAPHY. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

DRAWING. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

ENGLISH. — Preparation in English should develop in the candidate (1) ability to express himself well and correctly in his mother tongue, and (2) ability to penetrate through language to the meaning that underlies it.

All candidates for admission — whether by examination or by certification — are urged to secure a thorough training in composition, in which at least part of the subjects written on shall be derived from personal observation, experience, or thought. They are urged to cultivate especially, in all their writing, the habit of correctness in spelling, grammar, punctuation, sentence structure and paragraph building. This habit will be of much greater help to them in their English work in the college than will mere knowledge of the prescribed books.

In the examination, direct questions may be put, including questions upon grammar. Several compositions, each about one hundred and fifty words long, will be required, including papers to test the candidate's ability to think and write clearly, either on matters involving personal experience or on topics involving knowledge of the books. All candidates received as members of the freshman class are expected to be able — as a result of their study of the books prescribed "For Study and Practice" — to paraphrase or interpret, with some insight, unfamiliar verse or prose of medium difficulty, in which the meaning does not depend on anything outside the passage itself; and, as part of every examination, at least one passage is given for such interpretation.

The following list of books is made up from the list recommended by the Conference on Uniform Entrance Requirements in English. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of June preceding the examinations.

For 1910, 1911: —

(*a*) For reading and composition practice: Shakspere's "Merchant of Venice" and "Julius Cæsar;" the "Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography;" Scott's "Ivanhoe;" Hawthorne's "House of the Seven Gables;" Dickens's "A Tale of Two Cities;" Scott's "The Lady of the Lake;" Macaulay's "Lays of Ancient Rome;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur."

(*b*) For detailed study and practice: Shakspere's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

For 1912: —

(*a*) For reading and composition practice: Shakspere's "As You Like It" and "Julius Cæsar;" Franklin's "Autobiography;" Goldsmith's "The Deserted Village;" Dickens's "A Tale of Two Cities;" George Eliot's "Silas Marner;" Irving's "Sketch Book;" Scott's "The Lady of the Lake;" Byron's "Mazeppa" and "The Prisoner of Chillon;" and Macaulay's "Lays of Ancient Rome."

(*b*) For thorough study and practice: Shakspere's "Macbeth;" Milton's "Comus," "L'Allegro" and "Il Penseroso," or Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

For 1913, 1914, 1915: —

*English Grammar and Composition.* — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

*Literature.* — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively reading and study, from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), Book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essays on Burns."

*Examination.*[1] — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

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[1] Read in connection with this statement the first three paragraphs under "English," pp. 27, 28.

The second part of the examination will include composition and those books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects, perhaps five or six, from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

French. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

Geology. — Grouped with zoölogy, which see.

German. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-years requirements).

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first two books of Xenophon's "Anabasis;" and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from the first book of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the forms and constructions of the passages.

HISTORY. — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," books I. to IV., or an equivalent, and from Cicero's "Orations against Catiline;" and (*b*) the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from books I. and II. of Virgil's "Æneid;" and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

Mathematics. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents; the formulas for the $n$th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

Physics. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy and geology are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, and some option will be given the student among questions, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

### E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

### F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. Candidates must in 1909 receive credit for at least ten and one-half units; in 1910, for eleven and one-half units; and thereafter for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted. For a special provision permitting entrance with a condition in English, see footnote, p. 24.

4. Opportunities for removing entrance conditions are given six weeks after the opening of the college year. If a student fail at that time to clear his record of conditions, he may be given a second opportunity two weeks before the close of the first semester of the freshman year.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Preliminary examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

### G. UNCLASSIFIED STUDENTS.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

# COURSES OF INSTRUCTION.

## A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

### FRESHMAN YEAR.

#### *First Semester.*

[All work required.]

| | |
|---|---|
| English, | 4 |
| French or German,[1] | 4 |
| Algebra, | 5 |
| Chemistry, | 3 |
| Hygiene, | 1 |
| Physical education,[2] | 2 |
| Public speaking (at option of instructor), | 1 |
| College life (attendance required without credit). | |
| | 19 or 20 |

#### *Second Semester.*

[All work required.]

| | |
|---|---|
| English, | 4 |
| French or German, | 4 |
| Geometry and trigonometry, | 5 |
| Chemistry, | 3 |
| Elementary agriculture, | 2 |
| Physical education, | 2 |
| Public speaking (if not taken in semester 1), | 1 |
| | 20 or 21 |

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[1] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

[2] Physical education includes military training.

## SOPHOMORE YEAR.

### *First Semester.*

[All work required.]

| | |
|---|---|
| English, | 2 |
| French or German, | 3 |
| Agronomy, | 3 |
| Zoölogy, | 3 |
| Physics, | 5 |
| Physical education, | 2 |
| | 18 |

### *Second Semester.*

[All courses under "Required," with any two of those under "Elective."]

[Required.]

| | |
|---|---|
| English, | 2 |
| Elementary horticulture, | 2 |
| Botany, | 4 |
| Agricultural industry, | 3 |
| Physical education, | 2 |
| | 13 |

[Elective.]

| | | |
|---|---|---|
| French or German, | each 3 hours. Any two, | 6 |
| Animal husbandry, | | |
| Geology, | | |
| Physics, | | |
| Chemistry, | | |
| Surveying, | | |
| | | 19 or 18 |

## JUNIOR AND SENIOR YEARS.

In the junior and in the senior year, work must be taken each semester amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

| | |
|---|---|
| Physical education, two credits each semester of junior year, | 4 |
| Political science (Course 1, Economics), | 3 |
| English (any of the elective courses except Literature 15 and 16), | 3 |

[Elective.]

Unless otherwise stated, elective courses are open to both juniors and seniors. Elections are subject to such provisions as either the faculty or the instructors in the courses may declare. In electing courses, students will prepare the statement of their elections strictly in this form: —

For semester $\begin{smallmatrix}\text{one}\\ \text{two}\end{smallmatrix}$ of 1910–11, I elect these courses, namely: —

| No. of Course in Catalogue. | Name of Course in Catalogue. |
|---|---|
| | |

(Signed) ____________________

Class of 191__.

[Only those courses are here mentioned which are entirely elective; some courses that are open to election by part of the students but are required courses for others are omitted. For such courses, see under the respective department headings the descriptions of "Required Courses."]

- Agricultural education, 1, 2, 3, 4, 5, 6.
- Agriculture: —
  - Agriculture, 3.
  - Agronomy, 3, 4, 6, 8.
  - Animal husbandry, 2, 3, 4, 5, 6.
  - Dairying, 1, 2, 3, 4.
  - Farm administration, 3, 4.
- Botany, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14.
- Chemistry, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 17, 18, 19.
- Entomology, 2, 3, 4.
- Horticulture: —
  - Horticulture, 3, 4, 6, A.
  - Pomology, 1, 2, 3, 4.
  - Floriculture, 1, 2, 3, 4.
  - Landscape gardening, 1, 2, 3, 4, 5, 6.
  - Market gardening, 2, 3.
  - Drawing, 1, 2.
- Humanities: —
  - English: —
    - English language; journalism, 9, 10, 15, 16, 17.
    - Literature, 9, 10, 13, 14, 15, 16, 18.
    - Public speaking, 8, 9, 10.
  - Modern European languages: —
    - French, 6, 7, 8.
    - Spanish, 1, 2.
    - German, 6, 7, 8.
  - Music, 1, 2.
  - Political science, 2, 3, 4, 5, 6, 7.
- Mathematics, 7, 10; Physics, 6, 9, 15; Engineering, 8, 11, 12, 13, 14.
- Military science, 11, 12.

Physical education, 7, 8, 9, 10.
Rural sociology: —
  Agricultural economics, 4, 5, 6, 7, 9, 10.
  Rural sociology, 12.
Veterinary science, 1, 3, 4.
Zoölogy and geology: —
  Zoölogy, 3, 4, 5, 6, 7, 8, 9.
  Geology, 2.

## B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. Under the heading "Required Courses" are classified all courses that are specifically required of any group of students, although in some cases the same courses are open to other students as electives. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 9, page 9 of the Rules. Announcements of courses that are not given in 1910-11 are inclosed in brackets.]

### *Department of Agricultural Education.*

Professor HART and Mr. JENKS.

*Elective Courses.*

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. METHODS. — A study of mental growth; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2. Professor HART.

4. Teachers' Agriculture. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical sciences as are adapted to the work of the public schools wishing to introduce agriculture as a subject of study; planning, and practical work in, school gardens; decoration of school grounds; equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3. Professor Hart and Mr. Jenks.

5. Seminar in Education. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: legislation and agricultural education, the place and value of agricultural science in school courses, etc. Seniors and graduate students; 2 hours. Credit, 2.
Professor Hart.

6. Seminar in Education. — As stated under Course 5.
Professor Hart.

## Division of Agriculture.

Professor Foord, Dr. Brooks, Assistant Professor Lockwood, Mr. Haskell, Mr. Gribben.

### Sections.

Agriculture.
Agronomy.
Animal Husbandry.
Dairying.
Farm Administration.

### *Agriculture.*

#### *Required Courses.*

2. Elementary Agriculture. — A brief course touching upon the application of science to the common things of the farm. The work of the agricultural experiment stations and its relation to farm practice will be considered. Lectures, text-book and laboratory. Freshmen; 1 laboratory and 1 lecture period. Credit, 2.

### *Elective Courses.*

3. Agricultural Seminar. — A brief survey of current agricultural literature, open to juniors and seniors electing work in the Division of Agriculture. Topics will be assigned and reports required. One hour. Credit, 1. Professor Foord.

## *Agronomy.*

### *Required Courses.*

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 lecture-hours. Credit, 3. Mr. Haskell.

### *Elective Courses.*

3. Field and Forage Crops. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Mr. Haskell.

4. Field Crop Improvement. — A study of the influences determining the yield and value of field crops, and of methods of selecting seed and plant with reference to crop improvement. Particular attention is given to the breeding of plants for early maturity, hardiness and disease resistance, so as to fit them to New England conditions. Lectures, laboratory and field work. Prerequisite, Agronomy 3; 1 lecture and 1 laboratory period. Credit, 2. Mr. Haskell.

6. Advanced Soils. — Theoretical and practical work on irrigation and drainage; soil survey, with the view of observing the relation between types of soil and its natural vegetation; soil mapping. Lectures, laboratory and library work; 1 lecture and 2 laboratory periods. Prerequisites, Agronomy 1 and Mathematics 8. Credit, 3. Mr. Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. Brooks.

### *Animal Husbandry.*

#### *Elective Courses.*

2. Types and Breeds of Farm Animals. — A general introductory course. The development, characteristics and adaptability of the more common breeds of farm live stock. Lectures; Plumb's "Types and Breeds of Farm Animals." Sophomores; 2 lecture periods and 1 laboratory period. Credit, 3. Mr. Gribben.

3. Principles of Live-stock Improvement. — A careful study of the principles of inheritance, and a discussion of methods of improving herds or individual animals, of crossing and grading in the production of market and farm stock. Prerequisite, Course 2; 3 lecture periods; library references. Credit, 3. Mr. Gribben.

4. Dairy Cattle. — Score cards as applied to breed type and their use in scoring for advanced registry; herd book study. One object is to acquaint the student with the various families of the different breeds, their producing powers and external characteristics. The men who will represent the college in judging contests will be chosen from those electing this course, according to the merit of their work. Text-book, lectures and laboratory work; textbook, Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2. Mr. Gribben.

5. Horses, Sheep and Swine. — A course similar to Course 4, but dealing with different classes of stock. Of necessity, the study cannot be so detailed as that made in the preceding course, yet a good working knowledge of the judging of these classes is aimed at.

The course will consist largely of judging practice, with some periods devoted to lectures, covering such topics as unsoundness in horses and the determination of age in domestic animals. Text-book, lectures and laboratory work. Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2.
Mr. GRIBBEN.

6. FEEDING AND MANAGEMENT OF FARM LIVE STOCK. — The principles of nutrition; their relation to stock feeding; the balanced ration; feeding standards; feed stuffs, method of manufacture, economy to the feeder; economical feeding and management of farm animals; feeding for special purposes (as of dairy cows for records and in preparation for public sales or exhibitions). Text-books and lectures; text-books, Henry's "Feeds and Feeding" and Jordan's "Feeding Farm Animals;" experiment station bulletins. Students electing this course are advised to present Chemistry 5 and 6 and register in veterinary science; 3 hours. Credit, 3.
Mr. GRIBBEN.

### *Dairying.*

#### *Elective Courses.*

1. MILK AND ITS COMPOSITION. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 3; 2 lecture hours and 1 laboratory period. Credit, 3.
Assistant Professor LOCKWOOD.

2. MARKET MILK. — A study of the market milk conditions, extent and development of the business, supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection; a study of bacteriology relative to milk and dairy work. Must be preceded or accompanied by Animal Husbandry 4. Prerequisite, Course 1; 2 lecture hours and 1 laboratory period. Credit, 3. Assistant Professor LOCKWOOD.

3. Butter Making. — A study of hand and factory separators, separator construction and cream separation; handling milk and cream for butter making on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy-building construction; plans for dairy buildings, arrangement, ventilation, light, sanitation; dairy machinery and care thereof; practical mechanics as applied to the creamery; cement construction as related to dairy construction work. Prerequisites, Courses 1 and 2; 2 lecture hours and 1 laboratory period. Credit, 3.

Assistant Professor Lockwood.

4. Manufactured Milk Products. — Manufacture of other dairy products than butter. Cheddar and fancy cheeses; condensed milks; whey butter, cottage cheese, ice cream, casein, milk powder, etc.; dairying in other countries; library work. Must be preceded or accompanied by Animal Husbandry 6. Prerequisites, Courses 1, 2 and 3; 2 lecture hours and 1 laboratory period. Credit, 3.

Assistant Professor Lockwood.

## *Farm Administration.*

### *Elective Courses.*

3. Farm Equipment. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3.

Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3.

Professor Foord.

## *Department of Botany.*

Professor STONE, Assistant Professor OSMUN, Mr. JENNISON.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

### *Required Courses.*

2. HISTOLOGY, PHYSIOLOGY, MORPHOLOGY AND CLASSIFICATION OF PLANTS. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analysis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN and Mr. JENNISON.

### *Elective Courses.*[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; col-

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[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

lateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.
Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; 1 two-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; 1 two-hour laboratory and 1 one-hour lecture period. Credit, 2.
Professor STONE, Assistant Professor OSMUN and Mr. JENNISON.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; 3 three-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; 2 or 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4 or 5.
Professor STONE.

10. Economic Fungi. — As stated in Course 9. Prerequisite, Course 9. Professor Stone.

11. Plant Physiology. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 5. Professor Stone.

12. Plant Physiology. — As stated in Course 11. Prerequisite, Course 11. Professor Stone.

13. Physiology and Pathology of Shade Trees. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; 2 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4. Professor Stone.

14. Physiology and Pathology of Shade Trees. — As stated in Course 13. Prerequisite, Course 13. Professor Stone.

### *Department of General and Agricultural Chemistry.*

Professor Wellington, Associate Professor Chamberlain, Assistant Professor Howard.

[The courses in chemistry aim to teach accurate observation, logical thinking and systematic and constant industry, together with a comprehensive knowledge of the subjects presented. Instruction is given through text-books, lectures and a large amount of laboratory work under supervision. The laboratory work at first consists of the study of the properties of elementary matter, the analysis of simple combinations, and their artificial preparation. This is followed by the quantitative analysis of salts, minerals, soils, fertilizers, and the chemistry of various manufacturing industries, especially those of agricultural interest, such as are concerned in the production of sugar, starch and dairy products; the preparation of animal and plant foods, their digestion, assimilation and economic use; and the official analysis of soils, insecticides, fungicides, waters, milk, wine, and other animal and vegetable products.]

*Required Courses.*

1. THE NON-METALS. — An introduction to chemical laws. The commoner non-metallic elements, their occurrence in nature, and their uses in the arts, are studied. Lectures and laboratory exercises. Freshmen; 4 hours. Credit, 3.

Assistant Professor HOWARD.

2. THE COMMON METALS. — This course extends the study of Course 1 to the metals common in the arts, and includes blowpipe analysis and elementary determinative mineralogy. Lectures, recitations and laboratory exercises. Prerequisite, Course 1. Freshmen; 4 hours. Credit, 3.

Assistant Professor HOWARD.

*Elective Courses.*

4. QUALITATIVE ANALYSIS. — A course in the systematic analysis of the important metals and acids and their salts. Students electing advanced courses in chemistry should take this course. Lectures and laboratory work; Treadwell-Hall's "Analytical Chemistry." Prerequisite, Course 2. Sophomores; 6 hours. Credit, 3.

Assistant Professor HOWARD.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues, through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry; and forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for possible future work in agricultural chemical investigation. Prerequisites, Courses 1, 2 and 4. Those electing Course 5 are expected to elect Course 6. Juniors; lectures, 3 hours; laboratory, 4 hours. Credit, 5.

Associate Professor CHAMBERLAIN.

6. — As stated under Course 5.

Associate Professor CHAMBERLAIN.

7. Agricultural Chemistry. — A course continuing through the two semesters of the junior year. This course and Course 8 are designed as an alternative for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but who are planning to enter practical agricultural work and desire a somewhat further knowledge of chemistry as it is related directly to agriculture and agricultural problems. The work is planned in two parts, viz., *Course 7, Inorganic Agricultural Chemistry,* the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the common materials of construction, such as tile, brick, cements, paints, oils, etc.; and *Course 8, Organic Agricultural Chemistry,* the study of plants and animals as to composition, nutritive value and general processes of nutrition and growth, and also the study of products manufactured from them, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspect of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8; lectures, 3 hours. Credit, 3.

Associate Professor Chamberlain.

8. — As stated under Course 7.

Associate Professor Chamberlain.

9. Quantitative Analysis. — A course continuing through the two semesters of the junior year; for those who wish to acquire skill in chemical analysis. Students intending to enter experiment station or chemical-control work have here an opportunity to become familiar with the reactions and processes concerned. Prerequisite, Course 4. Juniors; those electing Course 9 are expected to elect Course 10; lectures, 1 hour; laboratory, 9 hours. Credit, 5.

Professor Wellington.

10. — As stated under Course 9. Professor Wellington.

11. Advanced General Chemistry. — This course makes a more thorough study of the physical laws and typical reactions than is made in Courses 1 and 2. For all students intending to

specialize in chemistry this course is required. Prerequisite, Course 4. Lectures, 1 hour; laboratory, 4 hours. Credit, 3.

Assistant Professor HOWARD.

13. PHYSIOLOGICAL CHEMISTRY, VEGETABLE. — This course and Course 14 are intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work, and who have had Courses 5 and 6, Course 13 will give acquaintance with the chemistry of the physiological processes in plants, and the action of physiological substances. Together with Course 14, it gives additional training in the chemical problems of agricultural experiment station work, and it will, with the courses in analytical chemistry, fit men for such work. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give additional knowledge of the facts and processes with which they will meet. It will consider more exactly and in greater detail the chemical and physiological aspect of problems which were treated generally in Courses 7 and 8. Prerequisites, Courses 5 and 6, or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN.

14. PHYSIOLOGICAL CHEMISTRY, ANIMAL. — A continuation, or counterpart, of Course 13, but dealing with animals. Prerequisites, Courses 5 and 6, or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Associate Professor CHAMBERLAIN.

15. CHEMICAL PROBLEMS. — A course in the historical progress of agricultural chemistry. The inception and growth of modern knowledge in agricultural chemistry will be intimately studied for the purpose of familiarizing the student with the experimental work and the logical processes of the more notable achievements in this department of chemistry. The course includes work in the biography and literature of research, as well as general chemical history. The classic works of Liebig, Wöhler, Liebermann, Baeyer, Gilbert, Henneberg, Tollens, Fischer and others will be taken up. In the light of the studies made, present-day problems in agricultural chemistry will be examined and methods for their solution tried. Prerequisites, Courses 5 and 6, 9 and 10, 11, 13, 14. Open to students only by permission; lectures, reading and laboratory work; 1 lecture and 4 laboratory periods. Credit, 5.

Professor WELLINGTON.

17. CHEMICAL PRACTICE IN AGRICULTURE. — This course and Course 18 are divided into subcourses as follows: —

*A. Analysis of Fertilizers, Insecticides and Fungicides.* — The theory, with a large amount of practice in this subject, is given under the close supervision of a teacher. The methods followed are in the first place comparative. Then the preferred official methods are intimately studied, especially with reference to their limitations. The students are impressed with the fact that, even at this late day, all of these methods require revision, and are only awaiting the clear head of the learned man and the expert technician for their improvement. Prerequisite, Course 4. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

*B. Analysis of Foods and Fodders.* — This course is pursued in a method uniform with that of Course 17*A*. Both courses are intended to fit men for experiment station and control work, as well as for research efficiency. The latest results of alimentation, physiology and the composition of foods and condiments are studied. The students will be urged to make inquiry for themselves in the fields of study. Prerequisites, Courses 5 and 6, 9 and 10, 13; co-requisite, Course 14: lecture 1 hour, laboratory 9 hours. Credit, 5.

*C. Chemistry of Sugar Making and Refining.* — In this course, after the chemical character of sugar and its function as a food have been determined, the theory and practice of the subjects named will be intimately studied. This involves practice in the analysis of many common chemicals, minerals and manufactured products, such as limestone, coal, boneblack, sulphites, clays, etc. The behavior of sugars and allied substances toward light, qualitatively and quantitatively, is investigated. The students are fitted for service in sugar houses and sugar refineries. Prerequisite, Courses 5 and 6; lectures 1 hour, laboratory 9 hours. Credit, 5.

*D. Dairy Chemistry.* — This course takes up instruction in the various processes of dairy chemistry, including chiefly the analysis of foods for dairy animals and the dairy products. Given in alternate years; given in 1910–11. Open only on permission; lectures 1 hour, laboratory 6 hours. Credit, 3. Professor WELLINGTON.

18. CHEMICAL PRACTICE IN AGRICULTURE. — As stated under Course 17. Professor WELLINGTON.

19. SANITARY CHEMISTRY. — This course is planned to bring into striking and intimate relationships many hitherto missing facts between the science of the lecture room and laboratory and the

actual practice of living as it is pursued in every condition in which a person finds himself between birth and death. It is hoped that this course will impart to every one who takes it new conceptions of the functions and duties of practical life. It is believed that, through carefully and minutely demonstrated experiments, this end will be attained. Given in alternate years; not given in 1910–11. Open only on permission; lectures 2 hours. Credit, 2.

Professor WELLINGTON.

## *Department of Entomology.*

Prof. C. H. FERNALD, Prof. H. T. FERNALD, Mr. SUMMERS.

**[A knowledge of insects is of importance in every department of life, and particularly in connection with agriculture, horticulture, biology, landscape gardening and forestry; it therefore forms part of a general education. An introductory course in this subject is accordingly offered in the junior year. For those who desire a further knowledge of the subject, because of its importance to their future occupation, a senior course is also offered, so arranged as to be of especial value for those who expect to take up agriculture, horticulture, landscape gardening, forestry or science teaching.]**

### *Elective Courses.*

2. GENERAL AND ECONOMIC ENTOMOLOGY. — This course comprises studies in the structure of insects as applied to their identification, and in the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collection and in the field, and methods for their control. The most important insecticides, and their preparation and application with different kinds of apparatus, are also treated. Field work in collecting insects is a part of the course; and this is accompanied by laboratory work on methods of pinning, pressing and mounting insects, and of classifying them. Juniors; 4 one-hour lecture periods till about May 1; thereafter 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4. Prof. H. T. FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

*A. Morphology.* — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

*B. Histology.* — Lectures on the internal anatomy and the histology of the various organs, with particular reference to those affected by the various insecticides.

*C. Insecticides and Apparatus.* — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects, tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work on adulterated materials.

*D. Coccidology.* — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

*E. Bibliography.* — Studies of the various sources of entomological publications and of the methods of finding the literature on any insect.

*F. Special Studies.* — In these studies the insects most closely related to the future occupation of the student will receive attention.

The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the structure, life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

## DIVISION OF HORTICULTURE.

Professor WAUGH,[1] Professor SEARS, Assistant Professor WHITE, Mr. TOMPSON,[2] Mr. HELLER, Mr. RANE, Mr. NOYES.

### DEPARTMENTS.

Horticulture.
Pomology.
Floriculture.
Landscape Gardening.
Market Gardening (Section).
Drawing (Section).

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[1] Absent on leave.

[2] Resigned; succeeded by Mr. Heller at beginning of semester two.

## *Department of Horticulture.*

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of horticulture.]

### *Required Courses.*

2. Nursery Practice. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Professor Sears.

### *Elective Courses.*

3. Plant Materials. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3. Professor White.

4. Plant Materials. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Perequisite, Horticulture 3; 2 lecture periods and 1 free afternoon. Credit, 3. Professor White.

6. Plant Breeding. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 two-hour laboratory period. Credit, 3.

*A. Forestry. — Courses in forestry cannot be definitely announced at the date of issue of this catalogue. After Sept. 1, 1910, a schedule of courses in forestry will be sent on application to prospective students. This schedule will be announced by personal letter to present students on or before September 1.*

## *Department of Pomology.*

### *Elective Courses.*

1. PRACTICAL POMOLOGY. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor SEARS.

2. PRACTICAL POMOLOGY. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor SEARS.

3. SYSTEMATIC POMOLOGY. — A study of the varieties of the different fruits and of nomenclature and the identification of varieties, with critical descriptions and special reference to relationships and classifications. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3. Professor SEARS.

4. COMMERCIAL POMOLOGY. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3. Professor SEARS.

### *Department of Floriculture.*

#### *Elective Courses.*

1. GREENHOUSE MANAGEMENT. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4.
Professor WHITE.

2. GREENHOUSE DESIGN AND CONSTRUCTION. — A study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisite. Floriculture 1; 7 hours. Credit, 4. Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Professor WHITE.

## *Department of Landscape Gardening.*

### *Elective Courses.*

1. Elements of Landscape Gardening. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected works of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 7 hours a week. Credit, 4. Mr. Noyes.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1. Mr. Noyes.

3. General Landscape Gardening. — Field notes; examination of completed works and those under construction; design of architectural details; planting plans; estimates; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 7 hours. Credit, 4. Professor Waugh and Mr. Noyes.

4. General Landscape Gardening. — As stated under Course 3. Prerequisite, Course 3.
Professor Waugh and Mr. Noyes.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.
Professor Waugh.

6. Ornamental Gardening. — An elementary course for students who take no other work in landscape gardening. The general principles and their simpler applications, such as the ornamental planting of farm yards, school grounds and streets, the care of estates, etc. Text-book, Waugh's "Landscape Gardening;" 3 hours. Credit, 3. Mr. Noyes.

## *Market Gardening.*

### *Elective Courses.*

2. Elements of Market Gardening. — A study of market gardening as a business, with detailed consideration of the conditions under which it is practiced. The problems of soil selection and soil management, garden fertilization and tillage, receive attention from the viewpoint of the market gardener, and considerable time is devoted to the study of garden crops. Juniors; prerequisite, Horticulture 2; 3 hours. Credit, 3. Mr. Heller.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of harvesting, storing and marketing; and making a thorough study of the greenhouse vegetable industry, and of the trucking business of the south with special reference to its effect on northern greenhouse vegetable growing. Some time is devoted to a study of the special forced crops, and an opportunity given to become familiar with the new and little known vegetables. Collateral reading required. Floriculture 2 must be taken in connection with this course. Seniors: prerequisite, Market Gardening 2; 5 hours. Credit, 3. Mr. Heller.

## *Drawing.*

### *Elective Courses.*

1. Freehand Drawing. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. (Was not given in 1909–10.) Juniors; 6 hours. Credit, 3. Mr. Noyes.

2. Mechanical Drawing. — Inking exercises; geometric problems; projection; intersections; isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. Noyes.

## DIVISION OF THE HUMANITIES.

Professor MILLS, Assistant Professor NEAL, Assistant Professor EYERLY, Mr. HOLCOMB, Mr. MACKIMMIE, Mr. ASHLEY, Mr. GREEN, Mr. MCKAY.

### DEPARTMENTS.

English.
Modern European Languages.
Music (Section).
Political Science.
Library.

[The Language Conference consists of the instructors in the departments of English and Modern European Languages, and the students enrolled in elective courses in these departments. Student attendance at the meetings is required.]

### *Department of English.*

English Language; Journalism.
Literature.
Public Speaking.

#### ENGLISH LANGUAGE.

*Required Courses.*

1. FRESHMAN ENGLISH. — Composition; introduction to literature. Recitations and lectures; theme writing; conferences.[1] Freshmen; 5 hours. Credit, 5.
Assistant Professor NEAL and Mr. MCKAY.

2. FRESHMAN ENGLISH. — As stated under Course 1. Prerequisite, Course 1; 4 hours. Credit, 4.
Assistant Professor NEAL and Mr. MCKAY.

3. SOPHOMORE ENGLISH.[2] — Composition; literature. Prerequisite, Course 2; sophomores; 2 hours. Credit, 2.
Assistant Professor NEAL.

4. SOPHOMORE ENGLISH.[2] — As stated under Course 3. Prerequisite, Course 3. Assistant Professor NEAL.

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[1] Student assistants, 1909-10: Samuel Weis Mendum, '10; Josiah Chase Folsom, '10; William Clarence Johnson, '10; Herbert Jonathan Baker, '11; Edgar Morton Brown, '11; Leonard Matthews Johnson, '11; Henry Alvan Brooks, '10 (first semester); Edward Harrison Turner, '10 (first semester); Bernhard Ostrolenk, '11 (second semester).

[2] Students whose work in Courses 1 and 2 reaches a standard satisfactory to the Department may be excused from not more than half of the sophomore work in English. At present, students in Course 3 or Course 4 are permitted, under restrictions to be stated by the Department, to substitute Public Speaking for English Language and Literature.

7. Training Course. — A course (*a*) required of student assistants in English, and (*b*) open (with the instructor's consent) to candidates for a tutorship. Candidates are expected to take it in qualifying for appointment. The course may be taken for either sophomore or elective credit. Two hours. Credit, 2.

Assistant Professor Neal.

8. Training Course. — As outlined under Course 5.

Assistant Professor Neal.

*A*. *Use of Library.* — Five lectures on the use of the Library. Hours to be appointed. Required of all sophomores in the first semester. Mr. Green.

[Enrolment in the elective courses in the Department of English is subject to the approval of the instructor. The membership in several of the courses is strictly limited; hence students are advised to plan their work well in advance in order to be sure of completing the required three hours of post-sophomore English. This credit must be made up without taking Literature 15 or 16. In each semester, the students enrolled in elective courses in English are expected to take part in the meetings of the Language Conference.]

### English Language; Journalism.

*Elective Courses.*

9. Journalism.[1] — Under the title "Journalism" are grouped agricultural journalism, newspaper and periodical writing and a somewhat more advanced study of journals and journalistic writing. All these courses are closely related. In the beginning, Courses 9*A* and 9*B* are identical; the introductory work in Course 9*B* — such as desk editing, proof reading, and especially the writing of news stories in simple reporting style — being deemed necessary as training preparatory to any kind of journalistic work. The chief differences between Course 9*A* and Course 9*B* are, (1) that Course 9*A* opens more immediate opportunities for practical work, as publication for a limited amount of the student writing is found in agricultural periodicals; and (2) that Course 9*B* opens the way for more varied observation and investigation, and for more varied experience in writing, contributing in these ways to general culture, as Course 9*A* contributes to specialized training.

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[1] The attention of students who elect courses in Journalism is specially directed to the courses given in the collateral subjects here mentioned: Agricultural Education, especially Courses 1 (Psychology) and 2. French, especially Courses 3-4, 5-6, 7-8. German, especially Courses 3-4, 5-6, 7-8. Spanish. Political Science, 1, 2, 3, 4, 5, 6, 7. Rural Social Science, 2, 4, 5, 6, 7, 9-10, 12, 14. English Language and Literature. Public Speaking. By judicious election among the scientific courses and among courses in the subjects named above, a student wishing to follow either agricultural or general journalism can broadly and effectively prepare himself for the profession.

*A. Agricultural Journalism.* — The production of "copy" adapted to the use of agricultural periodicals. The class, organized as an editorial staff, is charged with the preparation of an agricultural periodical. Two hours. Credit, 2.

*B. Newspaper and Periodical Writing.* — The elements of journalism — newspaper and magazine writing, reporting, editing, printing, etc. The class, organized as an editorial staff, is to issue a periodical. It is responsible for "covering" events, desk editing, copy and proof reading, making "dummies" and writing legends for illustrations, completing "forms" and "publishing" the periodical upon schedule time, etc. The first semester will be devoted principally to newspaper writing; the second semester to periodical writing. Two hours. Credit, 2.

*C. Proseminar in Journalism.* — Informal, beginning with a study by individual students of editorial writing and of types of magazine writing, such as "descriptive" articles, research articles, "human interest" articles, and articles in "popularized" science. Members of the class are expected to formulate through these studies theories of journalism and journalistic writing, to state them in thesis form, and to produce articles of the kinds studied. Reference reading and reports upon current periodicals may be called for. Prerequisite, a credit of not less than 2 hours in journalism; more being advised. One hour. Credit, 1.

9*A* and 9*B* may be taken at the same time; so — under restrictions stated in *C* — may 9*A* and 9*C* or 9*B* and 9*C*.

Assistant Professor NEAL.

10. JOURNALISM. — As stated under Course 9.

Assistant Professor NEAL.

15. ENGLISH LANGUAGE. — See Literature 15.

16. ENGLISH LANGUAGE. — See Literature 16.

17. ADVANCED COMPOSITION. — A course varying in plan, but usually concerned with some form of exposition, description or narration. Offered in 1910–11 if applied for. Two hours. Credit, 2.

Assistant Professor NEAL.

### LITERATURE.

#### *Required Courses.*

1, 2, 3, 4, 7 and 8. — See the courses so numbered under "English Language."

*Elective Courses.*

9. CULTURAL READING. — An individual reading course intended to encourage broader acquaintance with literature, art, philosophy (including psychology), or history (including political and social science). Students must, when enrolling, present in writing a detailed statement of the reading they purpose to do. The reading must be sufficient to require forty-five hours; must be strictly non-technical; may be in any of the subjects indicated above; must not consist in research; and may — subject to its purpose — be taken in any department by arrangement between the student and the instructor in the department concerned. If the reading be taken outside the Department of English, the student must, before presenting his outline of reading, secure in writing the endorsement thereof by the instructor under whom he is to read. Each student must prepare a two-thousand-word paper upon his reading, and this paper must be presented by the fourth Wednesday before the beginning of senior examinations. It must be accompanied with a written statement from the supervising instructor that the reading as outlined has been satisfactorily completed, and with a grade from him upon the subject-matter. Prerequisite, the sophomore courses in English; total credits allowed to one student for cultural reading work, 2. Credit, 1. Assistant Professor NEAL.

10. CULTURAL READING. — As stated under Course 7.
Assistant Professor NEAL.

13. LITERARY HISTORY. — A course dealing with some period of literary history; in 1909–10, Elizabethan literature was studied. Lectures, text-book or reference assignments, or class-room interpretation of authors; much outside reading; written studies upon announcement. Given upon application. Prerequisite, the sophomore courses in English. Two hours. Credit, 2.
Assistant Professor NEAL.

14. LITERARY HISTORY. — As outlined under Course 11.
Assistant Professor NEAL.

15. ENGLISH LANGUAGE AND LITERATURE. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Not given in 1909–10. Seniors; 3 hours. Credit, 3.
Professor MILLS.

16. ENGLISH LANGUAGE AND LITERATURE. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Not given in 1909–10. Seniors; 3 hours. Credit, 3.
Professor MILLS.

18. ADVANCED LITERARY STUDY. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types. Prerequisite, the sophomore courses in English; but those students who have taken or are taking courses in literary history or general reading will be the better prepared to take Course 18 with profit. In 1909–10, Shakspere; in 1910–11, the English novel. — Shakspere: The interpretation of two plays in class and the reading of two others outside; the life of Shakspere; collateral reading. Tests and examinations. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

### PUBLIC SPEAKING.

#### *Required Courses.*

1. FRESHMAN PUBLIC SPEAKING. — Freshman public speaking is required in either the first or the second semester, at the option of the instructor. Vocal exercises; practice in the delivery of declamations and interpretive readings. Freshmen; 1 hour. Credit, 1. Mr. MCKAY.

2. FRESHMAN PUBLIC SPEAKING. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1.
Mr. MCKAY.

3. SOPHOMORE PUBLIC SPEAKING. — Original speeches on assigned topics and declamations, supplemented by exercises in voice development and gesture. Elective within the English Department, as stated under English Language 3. Prerequisite, Course 1 or 2, or its equivalent. Sophomores; 1 hour. Credit, 1.
Mr. MCKAY.

4. SOPHOMORE PUBLIC SPEAKING. — Work of the same character as in Course 3, but more advanced. When conditions justify, special sections are formed in debating and interpretive reading. Elective within the English Department, as stated under English Language 3. Prerequisite, Course 3. Sophomores; 1 hour. Credit, 1. Mr. MCKAY.

### *Elective Courses.*

8. ORATORY. — Study of great orators; prescribed reading; speeches on assigned topics; the preparation and delivery of an oration, supplemented by a study of the principles of oratorical composition and delivery. It is especially recommended for those who desire to enter the Flint contest. Prerequisite, Course 3; 1 hour. Credit, 1. MR. MCKAY.

9. DEBATING. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2. MR. MCKAY.

10. DRAMATIC READING. — Critical study of one play; analysis of character, plot and incident; expressional reading of principal scenes. Plays preferably selected from Shakspere. Prerequisite, Course 3; 1 hour. Credit, 1. MR. MCKAY.

## *Department of Modern European Languages.*

### FRENCH.

### *Required Courses.*

1. ELEMENTARY FRENCH. — A beginning course. Fraser & Squair's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4. MR. MACKIMMIE.

2. ELEMENTARY FRENCH. — As stated under Course 1. Prerequisite, Course 1. MR. MACKIMMIE.

3. INTERMEDIATE FRENCH (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4. MR. MACKIMMIE.

4. Intermediate French. — As stated under Course 3, but not required of sopohomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. Mackimmie.

5. Advanced French (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.
Mr. Mackimmie.

### *Elective Courses.*

6. Advanced French (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatists will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Mr. Mackimmie.

7. French Language or Literature (fourth year). — Courses in more advanced subjects; to be announced; 3 hours. Credit, 3.
Mr. Mackimmie.

8. French Language or Literature. — As outlined under Course 7. Mr. Mackimmie.

## SPANISH.

### *Elective Courses.*

1. Elementary Spanish. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Mackimmie.

2. Modern Spanish Authors. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Mackimmie.

## GERMAN.

### *Required Courses.*

1. Elementary German. — Grammar and composition; the reading of short stories, poems, plays, etc. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. Ashley.

2. Elementary German. — As stated under Course 1. Prerequisite, Course 1. Mr. Ashley.

3. Intermediate German. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar; outside readings. Required of freshmen who present German for entrance and do not take French, and of sophomores who took Courses 1 and 2 as freshmen. Freshmen and sophomores; open upon arrangement to other students; 4 hours. Credit, 4. Mr. Ashley.

4. Intermediate German. — As stated under Course 3, but not required of sophomores who took Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. Ashley.

5. Advanced German. — The rapid reading of selections from the best authors (novels and dramas); outside reading in German periodicals of selected articles concerning various subjects and designed to promote research and reference work. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Mr. Ashley.

*Elective Courses.*

6. Advanced German. — As stated under Course 5; sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Mr. Ashley.

7. Readings and Investigations. — The reading of novels and journals; presentation by members of class of reports on periodical articles; reports upon assigned reference work in encyclopedias; 3 hours. Credit, 3. Mr. Ashley.

8. Readings and Investigations. — As stated under Course 7. Mr. Ashley.

### *Music.*

*Elective Courses.*

1. History and Interpretation of Music. — History of music among the ancients; medieval religious and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representantives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Mr. Ashley.

2. HISTORY AND INTERPRETATION OF MUSIC. — A continuation of Course 1. The Romantic school: Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1. MR. ASHLEY.

## *Department of Political Science.*

### *Required Courses.*

1. ECONOMICS. — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system; and the principles of consumption, production, exchange and distribution. Text-books, lectures and essays; required, but may be taken in either the junior or the senior year; 3 hours. Credit, 3. Assistant Professor EYERLY.

### *Elective Courses.*

2. GOVERNMENT. — The organization and working of the various kinds of government in the United States; government problems connected with transportation, taxation and monopolies; comparison of State leadership in American agriculture with that in European agriculture. Text-books, lectures and assigned reading; 3 hours. Credit, 3. Assistant Professor EYERLY.

3. SOCIOLOGY. — The nature, scope and principles of sociology; social origins and structures; control by custom, religion, education, public opinion, law, etc.; social ideals; practical problems in social progress. Lectures, text-book and assigned readings; 3 hours. Credit, 3. Assistant Professor EYERLY.

4. ECONOMIC HISTORY. — The economic history of England to the reign of Henry VIII.; the history of England and the American colonies in conjunction to 1783; and thereafter the history of England and of the United States. Emphasis is laid on economic history, but the more important political and religious movements are treated in their economic relations. Text-books, lectures and assigned reading; 3 hours. Credit, 3.

Assistant Professor EYERLY.

5. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fullness, ample attention is given

to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3.

Mr. HOLCOMB.

6. PRACTICAL PROBLEMS IN ECONOMICS. — An advanced course following Economics 1. A group of problems will be selected for careful study. Each student will make a special study of one of the following topics: labor, capital, money, banking, insurance, protection and free trade, railways, corporations, and the personal distribution of wealth. Lectures, assigned readings and reports; 3 hours. Credit, 3. Assistant Professor EYERLY.

7. THE HISTORY OF IDEALS. — This course is intended to supplement Course 4, treating history from the idealistic, rather than from the economic, point of view. It attempts to define the great ideals which have impelled the most important social, political, esthetic, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. The ideals of Christianity, including monasticism, modern Catholicism and Protestantism; of medieval art and architecture; of political and social democracy, including universal suffrage, the abolition of slavery, modern socialism and social reform — may be taken as examples. Lectures and required reading. Although Course 4 is not a prerequisite to this course, students should take both. Three hours. Credit, 3. Mr. HOLCOMB.

### *Department of Mathematics, Physics and Civil Engineering.*

Professor OSTRANDER, Associate Professor HASBROUCK,[1] Captain MARTIN, Mr. DUNCAN.

#### *Required Courses.*

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; binomial theorem, undetermined coefficients, summation of series, continued fractions, logarithms, theory of equations. Wells's "College Algebra." Freshmen; 5 hours a week. Credit, 5.

[Associate Professor HASBROUCK], Captain MARTIN and Mr. DUNCAN.

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[1] Absent on leave; classes in physics taken by Prof. Joseph O. Thompson of Amherst College.

2. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Gore's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY. — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.
[Associate Professor HASBROUCK], Captain MARTIN.

5. GENERAL PHYSICS. — Elementary mechanics and heat. Lectures, recitations and laboratory work. Text, Duff's "Text-Book of Physics." Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5.
[Adjunct Professor HASBROUCK], Dr. THOMPSON and Mr. DUNCAN.

*Elective Courses.*

6. GENERAL PHYSICS. — Electricity and light. Duff's "Text-Book of Physics." Lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.
[Adjunct Professor HASBROUCK], Dr. THOMPSON and Mr. DUNCAN.

9. ADVANCED PHYSICS. — The senior elective in physics is not offered for the year 1909–10.
Adjunct Professor HASBROUCK.

8. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.
Mr. DUNCAN.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2 and 4; 3 hours a week. Credit, 3.
Professor OSTRANDER.

10. DIFFERENTIAL AND INTEGRAL CALCULUS — A first course in the subject, with some of the more important applications. Snyder and Hutchinson's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 4 and 7; 5 hours. Credit, 5.
Professor OSTRANDER.

[11. HYDRAULICS AND SANITARY ENGINEERING.[1] — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures; 3 hours. Not given in 1910–11. Credit, 3.
Professor OSTRANDER.]

[12. ADVANCED SURVEYING.[1] — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures; 6 hours. Not given in 1910–11. Credit, 5. Professor OSTRANDER.]

13. STRESSES IN STRUCTURES.[1] — An elementary course in roof and bridge stresses. Text-book and lectures; 4 hours. Not given in 1911–12. Credit, 3. Professor OSTRANDER.

14. STRENGTH OF MATERIALS, FOUNDATIONS AND MASONRY CONSTRUCTION.[1] — Text-book and lectures; 5 hours. Not given in 1911–12. Credit, 5. Professor OSTRANDER.

15. ANALYTIC MECHANICS. — A course in theoretical mechanics, based on the calculus, with applications to problems. Text-book and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Not given in 1909–10. Credit, 3. Professor OSTRANDER.

17. DESCRIPTIVE GEOMETRY. — An elementary course; given only in 1909–10. Five hours. Credit, 3. Professor OSTRANDER.

### *Department of Military Science and Tactics.*

Captain MARTIN.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

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[1] Instruction in civil engineering will be given in two distinct courses of one year each, the courses alternating. The courses are open to students of the junior and senior classes.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

### *Required Courses.*

1. Introduction to Military Science and Tactics. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

2. Introduction to Military Science and Tactics. — As stated under Course 1. Freshmen; second semester after Spring recess; 3 hours. Credit, 1. Captain Martin.

3. Practice of Military Science and Tactics. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

4. Practice of Military Science and Tactics. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1. Captain Martin.

5. Theory of Military Science and Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1.
Captain Martin.

6. Theory of Military Science and Tactics. — As stated under Course 5. Sophomores; 1 hour. Credit, 1.
Captain Martin.

7. Practice of Higher Military Science and Tactics. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin.

8. Practice of Higher Military Science and Tactics. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1. Captain Martin.

9. Theory of Higher Military Science and Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports, returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1.
Captain Martin.

10. Theory of Higher Military Science and Tactics. — As stated under Course 9. Juniors; 1 hour. Credit, 1.
Captain Martin.

*Elective Courses.*

11. Advanced Military Science and Tactics. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors electing Courses 11 and 12 are re-

quired to report for three hours of work a week in the Department of Physical Education when drill is suspended. Seniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain MARTIN.

12. ADVANCED MILITARY SCIENCE AND TACTICS. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

## *Department of Physical Education and Hygiene.*

Assistant Professor REYNOLDS.

### HYGIENE.

*Required Courses.*

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1. Assistant Professor REYNOLDS.

### PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering. A similar examination is given at the beginning of the athletic seasons to all candidates for training for class or college athletic contests.]

*Required Courses.*

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1.
Assistant Professor REYNOLDS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

4. GRADED GYMNASTICS. — As stated under Course 3.
Assistant Professor REYNOLDS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

6. HEAVY GYMNASTICS. — As stated under Course 5.
Assistant Professor REYNOLDS.

*Elective Courses.*

7. Training Course. — Leadership of class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1.
Assistant Professor Reynolds.

8. Training Course. — As stated under Course 7.
Assistant Professor Reynolds.

9. Advanced Gymnastics. — For those who wish to become candidates for the gymnastic team. Credit, 0.
Assistant Professor Reynolds.

10. Advanced Gymnastics. — As stated under Course 9.
Assistant Professor Reynolds.

## *Department of Rural Social Science.*

President Butterfield, Assistant Professor Eyerly, Dr. Cance.

### Agricultural Economics.

*Required Courses.*

2. Agricultural Industry and Resources. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Dr. Cance.

*Elective Courses.*

4. Elements of Agricultural Economics. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; the agricultural market; determination of price; speculation; problems of land tenure and land values; business co-operation; farmers' organizations; the farmer and legislation; the maintenance of

the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Dr. CANCE.

5. HISTORICAL AND COMPARATIVE AGRICULTURE. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Dr. CANCE.

6. CO-OPERATION IN AGRICULTURE. — The course contemplates a somewhat comprehensive view of the history, principles and social relations of agricultural organization for profit. Part I., The business aspects of co-operation: (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, as illustrated by the most advanced and prosperous business organizations and exchanges, with particular reference to the marketing of perishable products. Part II., Social aspects of co-operation: The second part of this course treats of the social conditions necessary to successful co-operation; the effect of co-operation on character, *e.g.*, on individualism, conservatism; the relation of co-operation to political achievement, especially as illustrated in European countries; the influence of co-operation in begetting a community consciousness; and the effect of organization on class status. Lectures, assigned reading and practical exercises; 3 hours. Credit, 3. Dr. CANCE (Part I.)
Assistant Professor EYERLY (Part II.)

7. SPECIFIC PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively

some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems; land tenure; size of farms; causes affecting land values; private property in land; taxation and inheritance; special problems; marketing and manufacturing farm products; co-operative enterprises and farmers' societies; cost of production; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 hours a week. Credit, 2. Dr. CANCE.

9. SEMINAR. — Research in agriculture: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.
Dr. CANCE.

10. SEMINAR. — As stated in Course 9. Dr. CANCE.

### RURAL SOCIOLOGY.

*Elective Courses.*

12. THE RURAL COMMUNITY. — There are two general divisions of the subject. There is, first, a study of the social status of the rural population, including the significance of the movement to the cities, the present social conditions of farm people, the social effects of rural life, and the social aspect of various agricultural questions of a technical or economic character. In the second part of the study will be discussed the various social agencies in rural progress, such as means of communication, farmers' organizations, rural schools, means of agricultural education, rural religious institutions and the federation of rural social agencies. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President BUTTERFIELD and Assistant Professor EYERLY.

### RURAL LAW.

*Elective Courses.*

[14. RURAL LAW. — The course in rural law is given in 1909–10 in accordance with the announcement in the catalogue of 1908–09; but it will not be given again unless further announcement be made.]

## *Department of Veterinary Science.*

Professor Paige.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

### *Elective Courses.*

1. Introductory Bacteriology. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 two-hour laboratory exercises. Credit, 3. Professor Paige.

3. Veterinary Science. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor Paige.

4. Veterinary Science. — As stated under Course 3. Professor Paige.

## *Department of Zoölogy and Geology.*

Prof. Charles H. Fernald, Assistant Professor Gordon.

### ZOÖLOGY.

### *Required Courses.*

1. Elementary Zoölogy. — This forms the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor Gordon.

### *Elective Courses.*

3. Invertebrate Zoölogy. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate

Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

5. ANIMAL PARASITES. — A survey of this special field of zoölogy. Laboratory and lecture work, with outside reading. Laboratory technique. Seniors; not open to fewer than 3 students. Prerequisites, Courses 1, 3 and 4. Three two-hour periods, 2 one-hour periods. Credit, 5. Assistant Professor GORDON.

6. ANIMAL PARASITES. — A continuation of Course 5. Two two-hour periods, 1 one-hour period. Credit, 3. Assistant Professor GORDON.

7, 8 and 9. ADVANCED ZOÖLOGY. — See "Graduate School."

### GEOLOGY.

*Elective Courses.*

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 two-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

# THE GRADUATE SCHOOL.

# THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., President of the College.

CHARLES H. FERNALD, Ph.D., Director of the Graduate School and Professor of Zoölogy.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

## ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.
2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

### Nature and Methods of Graduate Work.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

## THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

The thesis in its final form, ready for the printer, must be submitted to the director of the school for examination by the committee on the graduate school before the candidate for the doctor's degree may take the required oral examination. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in the thesis.

All theses become the property of the department in which they are prepared. When they are printed, five copies of each thesis must be deposited with the department.

## FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

## DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

### COURSES FOR DEGREE OF MASTER OF SCIENCE.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.

### COURSES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zöology.

## GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

### (*a*) *Major Courses.*

BOTANY. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The following subjects in chemistry may be studied: —

(*a*) Inorganic analysis, qualitative (of the rarer elements) and quantitative.
(*b*) Crystallography.
(*c*) Physical chemistry.
(*d*) Descriptive and determinative mineralogy.
(*e*) Chemical geology.
(*f*) Soil formation.
(*g*) Soil physics and chemistry; gas analysis; synthetic inorganic work.
(*h*) Chemical theory and history.
(*i*) General organic chemistry.
(*j*) Special topics in organic chemistry.
(*k*) Elementary quantitative organic analysis.

(*l*) Proximate qualitative and quantitative organic analysis, including determination of organic radicles.

(*m*) Organic synthesis of aliphatic and aromatic compounds.

(*n*) Problems in chemical manufacture.

(*o*) Recent chemistry of plant nutrition.

(*p*) Animal physiological and pathological chemistry, including the chemistry of foods, of milk and milk industries, of urine, urinalysis, and the standards for feeding of all kinds.

(*q*) Toxicology.

(*r*) Insecticides and fungicides.

Frequent examinations on current chemical literature are given. Early in the course original work on some chemical subject pertaining to agriculture must be begun. The history and results of this work must, before the awarding of the degree, be submitted in the form of a thesis containing a distinct contribution to knowledge.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogamy; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology under these conditions.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

### (*b*) *Minor Courses.*

Zoölogy. — The courses in zoölogy are offered as a minor course to candidates for the degree of doctor of philosophy. They constitute an intensive course designed to give a broad outlook and to meet the needs of the specialist, and call for original investigation, laboratory dissection, technique and museum work. The subjects treated and the work done will vary according to circumstances, but may be outlined thus: —

(*a*) General and comparative anatomy, both gross and microscopic; ontogeny and phylogeny; life cycles, metamorphosis and metagenesis; animal associations, colonial, commensal and parasitic, and symbiotic associations of animals and plants; adaptation, adaptive radiation and parallelisms.

(*b*) Geologic, geographic and bathymetric distribution of animals.

(*c*) Systematic zoölogy, including paleozoölogy; museum and field technique.

(*d*) Economic zoölogy.

(*e*) History and development of zoölogical science.

(*f*) Weekly seminar and journal club meetings, in which all advanced students of zoölogy take an active part.

(*g*) Collateral reading; general knowledge of current zoölogical literature.

Other Subjects. — Courses in the other subjects open to choice as minors will be outlined according to the qualification and needs of the students applying for them.

# SHORT COURSES.

# SHORT COURSES.

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A. Organization, Expenses and Admission.
B. The Winter School.
C. The Summer School.
D. Itinerant Instruction.

## A. ORGANIZATION, EXPENSES AND ADMISSION.

ORGANIZATION. — The work of the short courses in the college was organized in September, 1909, with a director in charge.

The object of the short course work is threefold: —

(1) To bring to the college for instruction for a few days or a few weeks as many people as can possibly be reached in this way.

(2) To disseminate, by various methods, agricultural information to people who cannot come to the college even for a short time.

(3) To make the college as useful as possible to all the people of the Commonwealth who are interested in agriculture and country life.

The work for the first year has been organized thus: —

### *1. The Winter School.*

Ten weeks' general course.
Short course in poultry management.
Farmers' week.
Beekeepers' course.

### *2. The Summer School.*

Courses in agriculture for teachers and others interested in country life.

Courses for country clergymen.

Courses in home economics and domestic science for rural teachers, city teachers and clergymen's wives.

Conference for rural social workers.

### 3. *Itinerant Instruction.*

Correspondence courses.
Lecture courses.
Practical field demonstrations.
Traveling schools.
Educational trains (steam and trolley).
Educational exhibits at fairs.
Demonstration orchards.
Demonstration field experiments.
Services of expert agricultural authorities.
Agricultural surveys.
Advisory work with schools, State institutions and individuals.

EXPENSES IN THE SHORT COURSES. — The expenses of attending either of the short courses will be about as follows: —

| | |
|---|---|
| Tuition to citizens of the United States, | Free. |
| Furnished rooms with private families, per week, | $1–$3 |
| Board at college dining hall, per week, | $3.75 |
| Board with private families, per week, | $4–$5 |

Students in either of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work; the cost in Amherst is about $1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic before entering. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women. Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character.

Application for admission should be made as early as possible. Students should report to the professor in charge on Monday, Jan. 2, 1911, in order to begin work promptly on the morning of January 3.

## B. THE WINTER SCHOOL.

1. The Ten Weeks' Course.
2. The Short Course in Poultry Management.
3. Farmers' Week.
4. Beekeepers' Course.

## 1. THE TEN WEEKS' GENERAL COURSE.

### JAN. 2–MARCH 10, 1910.

### AGRICULTURE, DAIRYING, FRUIT GROWING AND FLORICULTURE.

*a.* Faculty.
*b.* Courses of Instruction.
*c.* Further Information.

### *a. Faculty.*

#### RESIDENT INSTRUCTORS.

KENYON L. BUTTERFIELD, President, and Professor of Rural Sociology.
ALEXANDER E. CANCE, Instructor in Agricultural Economics.
ELMER K. EYERLY, Assistant Professor of Political Science, Lecturer on Rural Sociology.
HENRY T. FERNALD, Professor of Entomology.
JAMES A. FOORD, Professor of Farm Administration.
EDWIN H. FORRISTALL, Farm Superintendent.
CHARLES R. GREEN, Librarian.
RAY L. GRIBBEN, Instructor in Animal Husbandry.
WILLIAM R. HART, Professor of Agricultural Education.
SIDNEY B. HASKELL, Instructor in Agronomy.
CHARLES S. HELLER, Instructor in Market Gardening.
WILLIAM D. HURD, Director of Short Courses.
HARRY H. JENNISON, Assistant in Botany.
WILLIAM P. B. LOCKWOOD, Assistant Professor of Dairying.
ROBERT W. LYMAN, Lecturer on Farm Law.
A. VINCENT OSMUN, Assistant Professor of Botany.
JAMES B. PAIGE, Professor of Veterinary Science.
FRED C. SEARS, Professor of Pomology.
JOHN N. SUMMERS, Assistant in Entomology.
EDWARD A. WHITE, Professor of Floriculture.
NEWTON WALLACE, Electrician.

#### NON-RESIDENT LECTURERS.

The instruction of the regular faculty will be supplemented each week by that of non-resident lecturers. These will usually be practical men who have been notably successful in their chosen work. A part list is given below: —

GEORGE A. DREW, Greenwich, Conn.
J. H. HALE, South Glastonbury, Conn.
CHARLES E. LYMAN, Middlefield, Conn.
C. L. GOLD, Middlefield, Conn.
WILFRED WHEELER, Concord, Mass.
A. MCNEILL, Chief of Fruit Division, Ottawa, Ont.

Clark Allis, Medina, N. Y.
Harold L. Frost, Arlington, Mass.
E. O. Orpet, South Lancaster, Mass.
Peter Fisher, Ellis, Mass.
William H. Elliot, Brighton, Mass.
Eber Holmes, Montrose, Mass.
M. A. Patten, Tewksbury, Mass.
Edwin McMulkin, Boston, Mass.

### *b. Courses of Instruction.*

1. Soil Fertility. — The nature of soils, their chemical and physical properties; the improvement of "run-down" land; tillage; green manuring; crop rotation; drainage; stable manures, their value, composition, preservation and application; commercial fertilizers, their nature, and the materials which furnish their different elements; fertilizers for different crops, the duplication of formulæ; lime and liming. Three exercises a week for ten weeks.

2. Market Gardening. — A general survey of the market-gardening business, together with a study of the most important problems involved, such as location, soils, fertilizers, crops, systems of cropping, markets and marketing. Three exercises and a laboratory period a week for ten weeks.

3. Fruit Growing. — The work in this course will deal with the practical side of the growing and marketing of fruits. Especial attention will be given to such questions as the selection of site for the plantation, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing. Lectures, supplemented with demonstrations, and, wherever possible, actual work by the students. Five exercises a week for ten weeks. Students electing horticulture will be required to take Course 1, and are recommended to take Courses 10 and 11.

4. Floriculture. — This course is outlined with the idea of furnishing young men who have not the time to devote to a longer course with the theoretical and practical considerations which are essentials for success in floriculture. The course will cover, as thoroughly as time will permit, those aspects of the work of special interest to the grower. Some of the topics to be considered are: greenhouse construction; greenhouse details, such as ventilators, gutters, benches, etc.; greenhouse furnishings and equipment; heating; florists' crops and florists' trade. In addition to the regular lecture work of the course, it is expected that lectures will be given by experts in growing special crops, such as roses, carnations, violets

and orchids. The co-operation of several of the most successful florists has been secured for these lectures. Students electing this course must also take Courses 1, 11 and 12. Five exercises a week.

5. Field Crops. — The production of field crops for New England; species and varieties, agricultural characteristics, methods of culture, rotations, harvesting and curing. The laboratory work will give the student practice in seed selection and testing for quality, purity and germination, and in corn and potato judging. See Course I. Three exercises a week for ten weeks.

6. Breeds of Live Stock and Animal Breeding. — The principles of breeding and the methods of improving farm stock. A study of the characteristics and development of our modern breeds of live stock, and their adaptation to New England conditions. Special attention will be given to dairy cattle. One exercise a week will be devoted to stock judging. Three exercises a week.

7. Live-stock Feeding and Management. — The character and composition of feeding stuffs, and their action and influence upon the animal body and production; practice in compounding rations; the principles and practice of the feeding, care and management of live stock. Two exercises a week.

8. Animal Diseases and Stable Sanitation. — Lectures upon some of the common diseases of live stock, giving special attention to methods of prevention, care and sanitation; the treatment of emergencies and accidents; how to keep animals healthy. Two exercises a week.

9. Dairying. — Milk and milk production; creaming methods; Babcock and acid tests; methods for testing individual cows; milk handling for local markets; ripening cream and butter making; dairy buildings, their lighting, ventilation and sanitation. Three one-hour, 2 two-hour and 2 three-hour periods.

10. Dairy Bacteriology. — The characteristics and functions of bacteria, and their relation to the different branches of the dairy industry; the scientific basis of cream ripening, sterilization, pasteurization, control of fermentation, and production of the best quality of market milk. Two exercises a week.

11. Botany. — A study of the structure, function and diseases of greenhouse, garden, orchard and field crops, together with methods of prevention, including spraying and the application of fungicides. One period each week will be devoted to laboratory work. Three exercises a week.

12. Entomology. — Animal parasites and their prevention. A study of the insects causing most injury to farm, orchard, garden

and greenhouse crops, and of methods for their destruction or control. Three exercises a week.

13. MECHANICS. — Care of boilers, engines and dairy machinery; installing and lining shafts and pulleys; calculating speeds of pulleys, etc.; cement foundations and floors; plans for farm and dairy buildings. One two-hour exercise a week.

14. FARM ACCOUNTS. — Practical work in keeping farm accounts and records; a simple system by which profits and losses of the farm may be traced to their original sources. One exercise a week.

15. FARM BUILDINGS AND MACHINERY. — Location and planning of farm buildings and water supply, and the construction, care and operation of farm machinery. One period a week for ten weeks.

16. RURAL BETTERMENT. — In order that those who attend the ten weeks' course may receive instruction in topics of vital interest to rural communities, as well as in the so-called more practical agricultural subjects, several lectures will be given as the course proceeds. The subjects and lecturers are named below; hours will be arranged to avoid conflict with other exercises.

Rural Sociology, President BUTTERFIELD and Prof. ELMER K. EYERLY.
Rural Education, Prof. WILLIAM R. HART.
Rural Economics, Dr. ALEXANDER E. CANCE.
Farm Law, Judge ROBERT W. LYMAN.

### *c. Further Information.*

ASSEMBLY. — All students in the Division of Short Courses are required to attend a weekly assembly, at which an address of general interest is usually given. Attendance at morning chapel service, four times a week, is also required.

## 2. SHORT COURSE IN POULTRY MANAGEMENT.

### *Faculty and Specialists. Description of the Work.*

Mr. JOHN H. ROBINSON, Boston, Mass., Editor of "Farm Poultry," author, and recognized authority on poultry subjects. — The economic aspects of the poultry industry; systems of poultry keeping; selling poultry products; business methods of the poultryman; egg production, poultry houses, breeding problems.

Prof. F. C. ELFORD, Professor of Poultry Management, MacDonald College, St. Anne de Bellevue, Quebec. — The colony system of housing poultry; judging utility poultry; feeding poultry; crate and pen fattening; killing, dressing and marketing poultry.

Prof. James E. Rice, Professor of Poultry Husbandry, Cornell University, Ithaca, N. Y. — The breeding, feeding, care and management of poultry.

Mr. Edwin F. Gaskill, in charge of poultry experiments at Massachusetts Experiment Station, Amherst, Mass. — The operation of incubators and brooders, and the feeding of poultry.

Mr. D. J. Lambert, in charge of poultry work at Rhode Island State College, Kingston, R. I. — Breeds and types of poultry; breed characteristics, scoring and judging demonstrations.

Dr. George Shurtleff, Boston, Mass. — Lectures and demonstrations on caponizing.

Mr. Henry D. Smith, Rockland, Mass. — The South Shore soft roaster business.

### *Other Instructors.*

Besides the poultry specialists mentioned above, the following members of the faculty of the Massachusetts Agricultural College will also give instruction in the poultry course: —

Prof. William D. Hurd, Director of Short Courses. — The production of poultry feeds; value of poultry manure; soils for the poultry yard; drainage and renovation.

Dr. James B. Paige, Professor of Veterinary Science. — The diseases of poultry, their prevention and treatment.

Prof. Fred C. Sears, Professor of Pomology. — Small fruits as an adjunct of the poultry business.

Mr. Charles S. Heller, Instructor in Vegetable Gardening. — How market gardening can be made a part of the poultry business.

Mr. Ray L. Gribben, Instructor in Animal Husbandry. — Feeds, their composition; feeding rations, etc.

Mr. Clarence A. Jewett, Superintendent of Buildings. — The care and use of tools; practical work in constructing poultry houses, and poultry appliances.

### *The Massachusetts Agricultural College Poultry Show.*

In connection with the work of the short poultry course each year, a poultry show is held. This will be conducted in accordance with the practice of the best shows, the idea being to give the students training in preparing birds for exhibitions, and in showing them. Coops will be provided for all birds sent in for exhibition, and fowls will receive careful care and treatment. A competent judge will score all birds, and the score cards will be returned with the birds. Ribbons will be awarded. No entry fees are charged. Those who attend the course, and all breeders in the State, are invited to send in birds to this exhibit.

### 3. Farmers' Week.

In order to meet the needs of those who cannot come to the college for any long time, a very practical "farmers' week," four days in length, has been arranged. In the exercises of this week the regular college equipment will be used, and the work of the regular faculty will be supplemented by that of other lecturers and by means of demonstrations given by eminent men.

The work will be divided into three sections; namely, (1) General Agriculture: to include farm management, farm crops, dairying, animal breeding and feeding, veterinary science and bacteriology; (2) Horticulture: to include fruit growing, market gardening, floriculture and forestry; (3) Farmers' Wives' Section: to include lectures and demonstrations in home economics, cookery, and problems of home making.

Interesting exercises of the week will be the evening lectures by specialists in agriculture; the conferences pertaining to problems of rural betterment, aside from practical agricultural topics; a corn and grain show; and others. Complete programs will be published about February 1 each year; they will be sent upon request.

### 4. Beekeepers' Course.

The college has recently come into possession of a number of swarms of bees, which, with the equipment to be added, will afford an excellent opportunity to give practical information on beekeeping. The course will be given by Dr. William P. Brooks, Director of the Massachusetts Agricultural Experiment Station, and Dr. James B. Paige, — both experts, and of long experience in beekeeping, — and Henry T. Fernald, Professor of Entomology. Besides these, an expert will be engaged for the practical field work. A circular will be issued March 1 each year; it will be sent to all who make request for it.

## C. THE SUMMER SCHOOL.

1. Announcement, Purpose, Plan.
2. Faculty.
3. Courses of Study.
4. Conference for Rural Social Workers.
5. General Information.

### 1. *Announcement, Purpose, Plan.*

Announcement. — The summer school of agriculture of the Massachusetts Agricultural College for 1910 will open July 11 and close August 12. This will be the fourth session of the summer school; the sessions of 1907, 1908 and 1909 have been highly successful.

Origin and Purpose. — The work of the summer school was planned originally for school teachers, and those attending have largely been teachers. Special attention is given to the needs of this class of students. It has been found, however, that many persons who seek a general knowledge of theoretical and practical agriculture can come to the college conveniently in the summer. Extended courses are therefore offered for the benefit of such persons also. The last four days of the summer school are given up to a conference of rural social workers.

General Plan. — The formal instruction in the summer school is given in twenty courses. From these, each pupil may elect courses, calling for not less than ten nor more than fifteen exercises a week, unless a larger or small amount of work be permitted by the director. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises will be arranged for one afternoon of each week. These exercises concern topics of interest to all. Class excursions will be arranged for every Wednesday afternoon, and more extended excursions for all the school will be planned for every Saturday. These excursions will, as heretofore, be in charge of an instructor. In the past, they have proved a very enjoyable part of the work.

Round tables and special discussions will be arranged by various instructors, as their courses require.

A course of evening lectures on popular topics relating to the work of the school is included in the general program. Several able lecturers have already been engaged for this course. Like the other parts of the summer school work, the lecture course is entirely free.

### 2. *Faculty of the Summer School.*

As far as possible, members of the regular faculty of the college give the instruction in the summer school. This brings into use all of the valuable equipment of the laboratories and fields. When it is necessary to engage instructors outside the college, great care is taken to engage men who will fall into the spirit of the work, and who are eminent in their occupation. The faculty of the summer school of 1909 consisted of: —

KENYON L. BUTTERFIELD, President of the college.

FRANK A. WAUGH, Dean of the summer school, head of the Division of Horticulture, and Professor of Landscape Gardening.

GEORGE E. STONE, Professor of Botany.

HENRY T. FERNALD, Professor of Entomology.

WILLIAM R. HART, Professor of Agricultural Education.

JAMES A. FOORD, Professor of Farm Administration.

FRED C. SEARS, Professor of Pomology.

EDWARD A. WHITE, Professor of Floriculture.

A. VINCENT OSMUN, Assistant Professor of Botany.

WILLIAM P. B. LOCKWOOD, Assistant Professor of Dairying.

SIDNEY B. HASKELL, Instructor in Agriculture.

HAROLD F. TOMPSON, Instructor in Market Gardening.

RAY L. GRIBBEN, Instructor in Animal Husbandry.

FLOYD B. JENKS, Instructor in Agricultural Education.

ALEXANDER E. CANCE, Instructor in Agricultural Economics.

ARTHUR C. MONAHAN, Principal of Turners Falls High School, Instructor in Chemistry.

EDWARD AVIS, Bird Lecturer, New York, Instructor in Bird Life.

EDWARD HOWE FORBUSH, Ornithologist of the Massachusetts State Board of Agriculture, Lecturer in Bird Life.

### 3. *Course of Study.*

#### A. COURSES FOR TEACHERS AND OTHERS.

1. SOILS AND TILLAGE. — The chemical, physical and biological composition of the soil, and the relation of each to plant growth; the formation of soils; natural and artificial sources of fertility; the methods and implements of tillage; all forming an introduction to modern scientific agriculture.

2. FIELD CROPS. — Class room, laboratory and field exercises designed to show modern methods of managing the principal field crops of New England, such as the grasses, the clovers, corn and potatoes.

3. FRUIT GROWING. — Modern methods of planting, cultivating, pruning, fertilizing and spraying fruit trees, of planning and managing orchards, and of selling fruit. Lectures, demonstrations and ample field exercises. A thoroughly practical course suited to everybody. Limited to 30 students.

4. PRACTICAL GARDENING. — This course will consist almost wholly of practical field exercises in planting, training, cultivating, etc.; and though no special effort will be made to put the work into

common school form, the exercises will be specially valuable to school-garden teachers. Course limited to 20 students.

5. Landscape Gardening. — A few elementary problems in landscape gardening, such as the design of school grounds, residence grounds and farm yards, and the fundamental principles governing ornamental planting; principally, however, an exemplification of methods for the use of the common landscape in school work, showing how to make it the basis of practical art instruction in the high school or in the grades.

6. Trees and Shrubs. — A practical course in arboriculture, treating of native and exotic trees and shrubs, and their identification, propagation and culture.

7. Forestry. — Forest species, forest composition, regeneration, management, exploitation, etc., with some attention to the economics of forestry, and with special reference to New England conditions. Those who wish to learn the fundamental facts and principles of the important subject of forestry, but who cannot spare the time for an extended course, will find this course especially adapted to their needs.

8. Domestic Animals. — This very instructive course will deal with the different breeds of farm animals, including poultry, — how to study and judge them, and modern methods of care, sanitation, breeding and feeding. Living domestic animals supply the best of all objects for teaching purposes in primary and intermediate schools, and this course should prove very suggestive to teachers.

9. Dairying. — A course including the latest methods in the production and handling of milk and cream, probably the most important branch of agricultural industry in Massachusetts. The course will be practical rather than theoretical, and will cover, briefly, the composition and secretion of milk; principles and methods of creaming; abnormal milk and its causes; the proper handling of milk and cream on the farm; the value of milk as a food; the relation of milk to the public health; the handling and care of milk in the home; and the methods used in producing sanitary and certified milk.

10. Agricultural Pedagogy. — The general subject of pedagogy will be treated with reference to its vocational aspects. The growth and function of professional and technical schools will be considered, together with the meaning of agriculture in modern education. The course is valuable to all teachers, but is especially recommended to those who teach agricultural or industrial subjects.

11. School Agriculture. — This course is intended for teachers in either the high school or the grammar grades. It will consist of field and laboratory exercises in various departments of practical agriculture and horticulture, following closely the work outlined in the "Bulletin on Public School Agriculture" (address the Department of Agricultural Education of the Massachusetts Agricultural College). The aim of this course is to show, in a concrete manner, just how agricultural subjects may be taught in the public schools. Every exercise will be capable of direct adoption in the ordinary schoolroom.

12. Elementary Chemistry. — An introduction to chemistry, with special reference to agriculture and the industries. The course consists largely of laboratory experiments, and is adapted particularly to the needs of science teachers; but it will be found useful by any one who wishes to know more about this fundamental science.

13. Plant Experiments. — A laboratory course, consisting of simple experiments in plant life with home-made apparatus. A valuable course for science teachers, and an interesting one for any one.

14. Plant Life. — A special study will be made of mushrooms and of ferns, their form, structure and classification. This course is especially suited to the needs of science teachers and amateur botanists.

15. Bird Life. — A study of the local bird fauna, conducted largely in the field. Special attention is given to the economic relations of the birds, and to nesting habits.

16. Insect Life. — An introductory course, planned with especial reference to the needs of teachers in the grade schools and the high schools; the forms selected for particular consideration being those most usually obtainable and of economic importance. The means of recognizing these insects and of checking their ravages will be given especial consideration, and methods of collecting, and of making school collections, will be explained. Special field studies in entomology will also be arranged for those who desire it.

### B. Courses especially for Country Clergymen.

17. The practical problems of the New England farmer.
18. The economic problems in American agriculture.
19. The development of the rural community.
20. The relation of the church to the rural community.
21. Forms of co-operation among farmers.
22. Rural literature.

### C. COURSES IN DOMESTIC SCIENCE.

23. For rural school teachers.
24. For teachers in city schools, and others interested.
25. For clergymen's wives.

### D. NEW COURSES.

The courses described below will be given for the first time in the summer of 1909–10. They are offered in addition to the courses already described.

10. SCHOOL GARDENING. — Lectures in garden work in planning, laying out, planting and cultivating school gardens. Five exercises a week, first two weeks. Professor HART.

14. AGRICULTURAL HIGH SCHOOL CHEMISTRY. — Lectures and experiments which can be used in high school work in applied chemistry of farm and home. Open to those who have had Course 13 or its equivalent.

Mr. MONAHAN and Professor HOWARD.

17. CRYPTOGAMIC BOTANY. — A laboratory course consisting of microscopic and field study of cryptogamic plants. For those who have taken Courses 15 and 16 at former sessions or who have had previous training in botany. Limited to 20 pupils. Two five-hour exercises weekly for two weeks, beginning July 25.

Professor OSMUN.

20. ENTOMOLOGY. — A course of lectures and laboratory work in entomology, more advanced than Course 19. Open to those who have taken Course 19, or its equivalent. Three lectures and 2 laboratory periods for four weeks. Mr. MATHESON.

21. DOMESTIC SCIENCE FOR RURAL SCHOOL TEACHERS. — A course of lectures and practical demonstrations of a very elementary nature in domestic science and home economics. This course will include only such work as would be helpful to, and within the possibilities of, the rural school teacher. Three lectures and 2 cooking demonstrations weekly for four weeks.

Miss RINAKER.

22. DOMESTIC SCIENCE AND HOME ECONOMICS. — A course of a more general nature, covering food problems, — the preparation

of food and the serving of meals. Three lectures and 2 demonstrations weekly for four weeks. Miss Rinaker.

23. Household Science. — This course is given especially for the wives of clergymen attending the summer school. Questions of food values, marketing, properly balanced menus, labor-saving devices for the home, etc. Three lectures and 2 demonstrations of cooking weekly, beginning July 25. Miss Rinaker.

24. New England Agriculture. — An outline of the agricultural situation in New England, considering general conditions, the status of agricultural practice and the farmers' business problems. The course is strongly recommended to clergymen, rural social workers and those interested in the broader aspects of New England agriculture. Five exercises weekly, beginning July 25. Professor Hurd.

25. Agricultural Economics. — A series of 10 lectures on agriculture considered as an industry and on some of the immediate social and economic problems of the farmer. Some of the topics treated are: The characteristics of the agricultural industry; the relation of agriculture to other industries; the maintenance of the economic position of the farmer; the farmer and the market; co-operative endeavors; organization of the rural social forces. The lectures will deal in a very general and simple way with the problems of farm life, and are designed to give a helpful viewpoint to teachers and leaders in rural communities. Five lectures weekly, beginning July 25. Dr. Cance.

26. The Development of the Rural Community. — Ten lectures, discussing briefly the question of community building in rural neighborhoods, community deals, forces to be utilized, and general programs for betterment. Last two weeks. President Butterfield.

27. The Church and the Rural Problem. — The course of lectures on "The Church and the Rural Problem" will open with a sketch of the movement which has developed the new interest in the community church. The contribution of the church to the economic and social life will be traced. The special task of the country minister, his difficulties, his problems and his ideals, will be considered. The aim of the lectures will be to show how the

church and the minister may aid, by leading the forces engaged in solving the rural problem. Five lectures weekly, beginning July 25. Mr. ANDERSON.

28. THE COUNTRY SCHOOL AND THE RURAL COMMUNITY. — A course in the problems and management of country schools and the study of rural social forces. This work will begin with a brief general survey of rural school conditions, and a study of their causes. The country teacher's problem and its attack will then be considered in some detail, emphasizing the local leadership of the teacher, showing the influence of the school as an agency of progress in rural development, and treating on its relation to other rural social and educative institutions. Among the topics to receive special attention are: The spiritualization of the school environment; the enrichment and vitalization of the courses of study; consolidation; the chief fundamental needs of the rural school system; the farm home, church, grange and farmers' institute, and their relation to the rural school problem; roads, libraries, telephones, the agricultural press, electric lines and automobiles, and their bearing upon the school situation; and the leadership of the school in the federation and redirection of rural social forces. Lectures beginning August 1. Miss CARNEY.

29. FORMS OF CO-OPERATION AMONG FARMERS. — This course will be a study of the various forms of co-operation among farmers, both in Europe and in the United States, with especial reference to the influence of collected effort on the intelligence, character and status of the farmer. Ten lectures, beginning July 25. Professor EYERLY.

30. RURAL LITERATURE. — A study of the literature, both prose and poetry, which interprets nature from the viewpoint of the lover of country life, and presents the idealistic side of agriculture and other rural pursuits. Ten lectures, beginning July 25. Mr. HOLCOMB.

31. THE MOVEMENT IN AGRICULTURAL EDUCATION. — The agencies involved in its promotion; its significance for rural life; its significance for educational theory. Ten lectures, beginning July 25. Professor HART.

### 4. *Conference for Rural Social Workers.*

The conference for rural social workers (Aug. 9, 10, 11 and 12, 1910) will include sections for rural school teachers, grade teachers of agriculture, high school teachers of agriculture, college teachers of agriculture, rural clergymen, rural librarians, grange lecturers and village improvement societies. These sections will each forenoon meet separately to discuss problems and methods. The afternoons will be devoted to a general session; probably one afternoon to education, another to rural religious life, another to the social agencies that make for better rural progress. Each evening a speaker of international reputation will deliver a lecture on a subject closely allied to the one discussed in the afternoon.

### 5. *General Information.*

Play and Recreation. — Though the spirit of earnest work predominates in the summer school, yet the necessity of encouraging play and recreation is not overlooked. Amherst is in one of the most historic sections of the country. Mountain and valley, stream and hill, offer ample opportunity for delightful walks and drives, and trolley lines extend in every direction into charming places. Field excursions form an important part of the courses of study. Excursions conducted by members of the faculty are usually made twice weekly to places of interest. Dancing, and tennis, baseball and other athletic contests offer opportunity, for those confined in schoolrooms or offices during the rest of the year, to get relaxation and to recuperate for the next year's work.

Election of Courses. — Election of courses should be made not later than the time of registering. Every election is subject to the approval of the director and of the instructor whose course is elected. As it is necessary to schedule several courses at the same hour, certain combinations of courses will be inevitable. Students should especially notice that certain courses are offered to a limited number only; and as a rule applicants will be accepted in these courses in the order of application. Each student should choose such a combination of courses as will keep two or three subjects in hand at the same time. This will meet the requirement that each student must take not less than ten and not more than fifteen class exercises a week, unless specially permitted to take more or less by the director.

Registration and Attendance. — Those who expect to attend should register as early as possible. A registration fee of $1 will be charged, payable at the time of application, either to the director of the summer school or to the college treasurer. Registration blanks may be had on application. Election of courses should be made at the time of application for registration.

Attendance will be required in the courses elected. The passing of an examination or test, or the presentation of a permanent note-book, will be required in each course. Those who satisfactorily complete their courses, including practically perfect attendance, will be given certificates showing what work has been thus completed.

Other Matters. — There are no rules nor regulations whatever. Persons are not admitted to the summer school who are not old enough to know how to behave, and every one is expected to know and to conform to the usages of good society. This absence of rules has worked admirably in the past, and it gives every one a sense of freedom based on personal responsibility, the basis of all proper government, whether in school, college or the community.

Tuition is free, and there are no incidental charges. The college is supported by the State and the federal governments, and receives no payments whatever from summer school pupils except for room and board and the registration fee mentioned above.

A bulletin giving full information about living expenses, rooms and board, naming the faculty, and describing the courses of study, will be issued each year about March 1, and can be had by writing to the Director.

## D. ITINERANT INSTRUCTION.

1. Correspondence Courses.
2. Lecture Courses.
3. Other Itinerant Instruction.

### 1. The Correspondence Courses.

*a.* Faculty.
*b.* Purpose and Description of Work.
*c.* Method of Conducting the Work.
*d.* Description of the Courses.
*e.* Additional Information.

### *a. Faculty of the College, giving the Correspondence Courses.*

James A. Foord, Professor of Farm Administration.
Ray L. Gribben, Instructor in Animal Husbandry.
Sidney B. Haskell, Instructor in Agronomy.
William R. Hart, Professor of Agricultural Education.
William D. Hurd, Director of Short Courses.

Floyd B. Jenks, Instructor in Agricultural Education.
William P. B. Lockwood, Assistant Professor of Dairying.
Fred C. Sears, Professor of Pomology.
Charles S. Heller, Instructor in Market Gardening.
Edward A. White, Professor of Floriculture.

### *b. Purpose and Description of the Work.*

The correspondence courses are offered in response to calls from all parts of the State from people who desire agricultural information, but who, for various reasons, cannot come to the college for it. These courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners and floriculturists, and of teachers, either in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice have changed, and are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added later.

### *c. Method of Conducting the Work.*

Though a large number of books have been written on various agricultural subjects, few of them are especially adapted to correspondence course work. For this reason our courses are conducted principally by means of especially prepared lessons. These lessons are somewhat in the nature of the lectures given in the regular college work. Whenever possible, a text-book is used for reference and supplementary study.

The lessons are sent out one at a time, and are either accompanied or followed by a list of questions. When the questions are satisfactorily answered or discussed, the next lesson is sent; and so on.

It is recommended that students take up the work in some logical order, *i.e.*, the courses in "soils" and "manures and fertilizers" should precede those in "field crops," "fruit growing" or "market gardening."

After such preliminary courses have been completed, two or more courses of study may be pursued at the same time, provided the student can devote sufficient time to the work to carry it on satisfactorily.

The courses are especially recommended to granges for study, and it is hoped that grange lecturers and other interested persons will organize study classes. When this is done, a representative of the college will visit the grange from time to time to conduct the class, discuss the work and offer suggestions.

### *d. Description of Courses.*

1. SOIL AND SOIL IMPROVEMENT. — The lessons in this course have been prepared by Prof. William D. Hurd. They treat of soil formation; the different types of soils, their agricultural characteristics and value; the relation of water, heat and air to soils; the improvement of "run-down" land; drainage, tillage, cover crops, crop rotation, etc. The cost of the course is $1.

2. MANURES AND FERTILIZERS. — The lessons in this course have been prepared by Prof. William D. Hurd. They treat of the sources of fertility on the farm; the care, value and management of stable manures, methods of application, etc.; the classification of commercial fertilizers, the characteristics of their different elements, the sources from which the different materials come, their agricultural characteristics, and the selection and mixing of materials for special crops; and the use of lime in agriculture. The cost of the course is $1.

3. FIELD CROPS. — The lessons in this course have been prepared by Mr. Sidney B. Haskell. The course treats of those field and forage crops of importance in New England, and treats of them especially from the viewpoint of the Massachusetts farmer. The crops studied are: maize, the small grains, giving special attention to their use as soiling crops; grasses, clover and alfalfa; and the various "money" crops generally included in a farm rotation. No text-book is used. Instruction is given by means of typewritten lessons, each with a list of questions. It is expected that the student will supplement his study by observation of the farms and farm practice in his immediate neighborhood. The cost of this course is $1.

4. FARM DAIRYING. — The lessons in this course have been prepared by Prof. William P. B. Lockwood. The course consists of several lessons upon the problems of the dairy farm. These lessons include discussions of buildings; of cattle and their care; of feeds and feeding; of the handling and care of milk; the Babcock fat test, hand separators, farm butter making; and markets and marketing. The cost of the course is $1.

5. FRUIT GROWING. — This course has been prepared by Prof. F. C. Sears. It is intended to answer the main questions that arise in carrying on a fruit plantation, from the time the trees are set

until the fruit is marketed. Some of the principal topics will be: selecting the site; choosing the varieties; selecting the trees; laying off and planting the orchard; fertilizing and cultivating, pruning, spraying; cover crops for orchards; harvesting and marketing the fruit. The cost of the course is $1.

6. Fruit Growing. — This course has been prepared by Mr. H. F. Thompson. Many times it is of considerable value to have outlined the skeleton upon which a body of knowledge of a subject can be satisfactorily built. With this fact in mind, the instructor has outlined a series of exercises for the work in market gardening, to indicate the fundamental problems of the market gardener. As an aid to this work, Bailey's "Principles of Market Gardening" will be used, supplemented with exercises prepared for this work. The cost of the course, including the text-book, is $2.50.

7. Animal Feeding. — The lessons in this course have been prepared by Mr. R. L. Gribben. The course takes up the fundamental principles of stock feeding, with their application to specific feeding problems common to New England agriculture. Only the largest domestic animals will be considered, most attention being given dairy stock, — the feeding of sheep, swine and horses being included. The composition, characteristics and selection of feeds will, with the calculation of balanced rations, be important topics of the course. One great aim will be to stimulate discussion of practical problems between the student and instructor. No text-book will be required. The cost of this course is $1.

8. Floriculture. — This course has been prepared by Prof. E. A. White. It is intended to be of service to florists who are desirous of becoming better acquainted with the methods of culture of commercial crops. The course will include twelve lessons on the methods or culture of roses, carnations, violets, chrysanthemums, orchids, bedding plants, bulbs, and other florist crops. The cost of the course is $1.

9. Farm Accounts. — This course has been prepared by Prof. J. A. Foord. It will consist of a brief study of the principles underlying all bookkeeping, followed by the practical working out in good form of a set of transactions similar to those met with on most New England farms. The system suggested will be simple, one that can be adapted to either the small farm or the large estate. The cost of the course is $1.

10. Agriculture in the Common Schools. — The lessons have been prepared, and the course is conducted, by Prof. F. B. Jenks. The course consists of twenty lessons designed to meet the needs

of pupils of the last two years of the grammar school or the first two years of the high school (provided it has not been covered in the grammar school). The work may form the basis for a year's work in either of these grades. A text-book will be used as a guide, but laboratory and field exercises (all of which can easily be done with hand-made apparatus), as well as supplementary reading, will be required. The list of references will include, besides books of prominent writers on agricultural subjects, United States bulletins and year books, and bulletins from the various State experiment stations. The cost of the course, including the text-book, is $2.10.

11. Agricultural Education. — This course has been prepared and is conducted by Prof. William R. Hart. It consists of twenty lessons. The object is to make a study of the current literature upon industrial education, especially such as bears upon the introduction of agriculture into the public schools. It is designed for all those who are interested in the leading questions of current educational discussion. The cost of the course is $1.

### *e. Additional Information.*

Expense Borne by the College. — In order that none shall enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of $1 for each course, payable in advance at the time of enrollment. This fee is not charged to cover the cost of preparing the course (for merely in the time of the instructors this cost is many times what is received), but is to defray expenses of postage and of the material used in the preparation of the lessons, and to insure a higher quality of work from those who enroll. The cost of a text-book, when one is used, is added to this enrollment fee. Remittances should be made by money order or check.

Enrollment. — Students may enroll at any time by applying to the Director of Short Courses, either personally or by letter. Enrollment should be made on the card furnished by the college. Membership in the correspondence courses entitles the student to receive, at reduced rates, the books used in the various courses, and others.

List of Reference Books for Supplementary Reading. — For those who desire to add some of the latest books to their libraries, for teachers who wish material for their work or for librarians who desire to place on the shelves of their libraries the latest agricultural publications, arrangements have been made with the

Orange Judd Publishing Company, Lafayette Street, New York City, to supply books at reduced rates. A classified list giving prices (postpaid) will be furnished to all who apply for it.

## 2. THE LECTURE COURSES.

The college also offers lecture courses. The lectures can be obtained by any agricultural organization, grange, farmers' club, board of trade, women's club, Young Men's Christian Association, church club or school, or by others who are interested in problems pertaining to agriculture and country life. Single lectures, or a series comprising a course, can be arranged for.

LECTURES AND SUBJECTS. — The faculty of the college are, of course, men busy with regular college duties, and can undertake only so many outside lectures as will not seriously interfere with their regular college work. For this reason it is advisable that those desiring lectures for a fixed date should make a second, and perhaps a third, choice, also, of lecturers, in order to secure some one. Lectures are offered as follows: —

KENYON L. BUTTERFIELD, President of the college: —
  The Mission of the Agricultural College.
  Co-operation for Rural Progress.
  Work of the Commission on Country Life.
WILLIAM P. BROOKS, Director of the Experiment Station: —
  What the Experiment Station does for the Farmer.
  Clover, Corn, Cows, and a Bank Account.
  Japan, its Farms and Farmers (suitable for mixed audiences, with or without stereopticon).
  Poultry Keeping for Egg Production.
  Experiments on the Farm: will they pay? what? how?
E. K. EYERLY, Assistant Professor of Political Science and Lecturer in Rural Sociology: —
  Social Aspects of Co-operation among Farmers.
  Social Need of Organized Agriculture.
HENRY T. FERNALD, Professor of Entomology: —
  How to control San José Scale.
  Market-garden Pests.
  Our Shade Tree Pests and their Treatment.
  The Insect Enemies of Fruit Trees.
JAMES A. FOORD, Professor of Farm Administration: —
  Alfalfa and the Clovers as Sources of Cheap Protein.
  Soil Fertility.
  Corn Growing and Seed Selection.
  The New England Corn Show: how to prepare for it.

Ray L. Gribben, Instructor in Animal Husbandry: —
- Selecting Good Cows.
- Building up a Good Herd.
- New Animal Industries in New England.
- Cow Testing.
- The Feed Problem.

William R. Hart, Professor of Agricultural Education: —
- Elementary Agriculture in the Public Schools.
- Agricultural Education and the Course of Study.
- The Educational Value of Agriculture as a Study.
- What it is to be educated.
- The Function of Agriculture in the Curriculum.
- Boys' and Girls' Agricultural Clubs.

Sidney B. Haskell, Instructor in Agronomy: —
- The Fertilizer Bill and the Clover Crop.
- Some Phases of German Agriculture.
- Grasses and Clovers.
- The Irish Potato.

Henri D. Haskins, in charge Fertilizer Division of the Experiment Station: —
- Selection and Use of Commercial Fertilizers.
- Home-mixed *v.* Factory-mixed Fertilizers.
- The Value of Peat in Agriculture.

William D. Hurd, Director of Short Courses: —
- Commercial Fertilizers from the Standpoint of the Farmer (with object lesson of home mixing).
- Restoration of Fertility to Run-down Land.
- Some Lessons from Maine Potato Growing for Massachusetts Farmers.
- Grass and Clover Production.
- Corn Improvement and Culture.
- The Sanitation of Rural Communities.
- Teaching Agriculture in Secondary Schools (illustrated with stereopticon views).
- Practical Education of the Farmer.
- The Massachusetts Agricultural College: its Organization and Work (illustrated with stereopticon views).

Floyd B. Jenks, Instructor in Agricultural Education: —
- Agriculture in the Schools of Massachusetts.
- Agricultural Education.
- Education of the Farmer's Boy and Girl.
- The Relation of the Home and School Garden to the Work of the School.
- The School Garden: its Plan, Arrangement and Management.

William P. B. Lockwood, Assistant Professor of Dairying: —
- Milk as a Food: its Care in the Home.
- Handling and Care of Milk on the Farm.
- Certified Milk.
- The Babcock Fat Test and its Importance in the Dairy, with Demonstrations of the Test.
- Dairy Farming.

Fred B. McKay, Instructor in Public Speaking and Assistant in English: —
  America's Call to her Youth.
  The Best Animal on the Farm.
James B. Paige, Professor of Veterinary Science: —
  Modern Methods in the Treatment of Disease.
  The Horse's Foot and its Diseases (illustrated by models and specimens).
  Blisters and Boils (blackboard required).
  The Prevention of Animal Disease by Vaccination.
  Stable Ventilation (stereopticon).
  The Conservation of our Poultry Industry.
Fred C. Sears, Professor of Pomology: —
  Personal Experiences in starting a Fruit Farm in Massachusetts.
  The Outlook for Orcharding in New England.
  The Spraying of Fruit Trees.
    Object Lessons: —
  Pruning Fruit Trees.
  Orchard Spraying.
  Packing Apples.
George E. Stone, Professor of Botany: —
  Cultivation and Care of Shade Trees (stereopticon).
  Village Improvement.
  Diseases of Market-garden Crops.
  Diseases of Farm Crops.
  Diseases of Florists' Crops.
  Diseases of Orchard Crops.
  Agricultural Investigation.
  Bacteria and the Role they play in Agriculture.
Philip H. Smith, in charge of Feed and Dairy Division of the Experiment Station: —
  Commercial Feeds: Results of their Inspection in Massachusetts, and a Discussion of those best suited for Cream and Milk Production.
Harold F. Tompson, Instructor in Market Gardening: —
  The Business of Market Gardening.
  The Home Vegetable Garden.
  Growing Vegetables under Glass.
  From Producer to Consumer, with Suggestions for Marketing Vegetables.
  The School Vegetable Garden.
Edward A. White, Professor of Floriculture: —
  Home Gardens.
  Ornamental Gardens, and Garden Material.
  Development of the Floricultural Industry in Massachusetts.
Charles H. White, Field Agent: —
  The Massachusetts Agricultural College: its Organization and Work (illustrated with stereopticon views).
  Grass Culture for Profit.
  Leadership in the Rural Community.
Frank A. Waugh, Professor of Landscape Gardening: —
  An Art Education on the Farm.
  The Use and Enjoyment of the Landscape.

Village Improvement.
The Improvement of Country Towns.
Suburban Gardening.
American Landscape Gardening.
Dwarf Fruit Trees.

TERMS ON WHICH LECTURES ARE GIVEN. — The purpose in offering lectures to the public is to enable as large a number of the people of the State as is possible to receive the instruction. When no admission fee is charged, the lessons and object lessons will be given free, provided the organization or person requesting the lecture pays the traveling expenses of the lecturer. When an admission fee is charged, the lecturer receives compensation in addition to his traveling expenses. Correspondence is invited regarding the selection of subjects for a course of lectures.

### 3. OTHER ITINERANT INSTRUCTION.

Besides the correspondence and lecture courses and the practical field demonstrations, the college is carrying on several kinds of itinerant instruction. Calls are constantly made on the college for help to be given at a distance from the institution; and to meet these calls a corps of field agents is being engaged. These men and women will serve as traveling instructors, giving instruction varying in length from a single lecture to traveling-school courses lasting several days. The traveling-school courses really consist of part of the work given at the college in "Farmers' Week," transferred to agricultural centers in the State. The traveling schools last two, three or four days.

Besides traveling schools the work of itinerant instruction in 1910 will be carried on by fitting up educational trains, both on steam railroads and on trolley lines, with educational exhibits. These trains will travel about the State, carrying instructors who will give lectures and demonstrations on agricultural subjects. The instruction undertaken will further include the assembling of educational exhibits to be shown at fairs, in connection with which lectures and demonstrations are given; practical field demonstration of spraying, and demonstration plot tests, duplicating in different parts of the State the work of the experiment station; the establishment of new orchards, and the renovation of old ones by way of demonstration; the carrying on of agricultural surveys, to obtain information that will be useful to the college, by showing the agricultural practices followed in different parts of the State, and what parts of the State are adapted to the different types of farming; the sending of men to help in the selection of land, and to advise about the management of farms; and the helping of the State institutions, and of trustees of estates or trust funds, to manage these in the most approved and economical way.

In short the spirit of the short-course work is that of service, and an effort is made to render the departments of the Massachusetts Agricultural College as helpful to the people of the Commonwealth as they can be. Correspondence is invited from any who desire such help as has been spoken of. Letters should be addressed to the Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

# GENERAL INFORMATION.

# GENERAL INFORMATION.

## A. FINANCIAL AND ADMINISTRATIVE.

### STUDENT EXPENSES.

TUITION. — Tuition is free to citizens of the United States; but students who are citizens of Massachusetts should apply to the senator of the district in which they live for a free scholarship. Blank application forms may be obtained from the registrar. The tuition charged persons not citizens of the United States is $120 a year.

DORMITORIES AND BOARD. — The college has dormitory accommodation for about 64 students. The rooms in the dormitories are occupied chiefly by the upper classmen, hence new students as a rule are obliged to room in private houses. The rooms in the college dormitories are unfurnished. They are mostly in suites of three, — one study room and two bed rooms. They are heated with steam and lighted with electricity. Students care for their rooms themselves. The rent for each person ranges from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1.50 to $3 a week for each occupant. All correspondence in regard to rooms should be addressed to the dean of the college.

Board can be had at the college dining hall. Good board is furnished at cost. At present the price of board is $3.75 a week. The price is determined by adding to the audited rate of the previous three months' period 5 per cent. At the end of the period, final settlement is made on the basis of actual cost.

### EXPENSES.

The necessary college expenses per year are estimated as follows: —

| | Low. | High. |
|---|---|---|
| Tuition: Citizens of Massachusetts free through State scholarships; other citizens of the United States free; foreigners, $120 a year. | | |
| Room in college dormitories or in private houses, . . . | $39 | $110 |
| Board in college dining hall, $3.75 a week, . . . . | 135 | 135 |
| Laundry, 50 cents to 85 cents a week, . . . . . . | 18 | 30 |
| Military uniform, first year, . . . . . . . | 15 | 15 |
| Laboratory fees, . . . . . . . . . . | 2 | 20 |
| Books, stationery and other miscellaneous, . . . . | 16 | 40 |
| | $225 | $350 |

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial demands made upon students which they should expect to meet. Chief among these are class assessments, support for the Musical Association and the Y. M. C. A., and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, college "Signal" (paper), etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is assumed by students joining a fraternity. Students rooming in college dormitories are obliged to equip their rooms with furniture. The college assumes no responsibility in regard to the safe-keeping of student furniture in dormitories, either during term time or vacation, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling the economical student will probably spend between $250 and $350 a year.

## Student Aid.

Self Help. — A number of students find opportunities for earning money without depending on the labor fund, and many rely upon labor of some sort to earn their way through college. A few men have paid all their way through college; a great many more have paid a large part of their expenses; and many have earned a small proportion of the cost of their course. But the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself at work. The college does not encourage students to enter without money in the expectation of earning their way. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in college, or, instead, to borrow money with which to complete his course. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for labor-fund employment, no one man can receive a large amount from that source.

Labor Fund. — An annual appropriation of $7500 for student labor is received from the State. This fund is used only in assisting students who are citizens of Massachusetts and dependent entirely or in part on their own exertions. So far as possible such students will be employed in some department of the college. The Department of Agriculture and the Department of Horticulture usually afford the most work. Application for student labor should be made directly to the president. Applicants must present a certificate signed by parent or guardian and by one of the selectmen of the town in which they reside, showing that they need the aid. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor.

SPECIAL NOTICE TO NEEDY STUDENTS. — *In the last year or two the demand for paid labor on the part of new students has exceeded the amount of employment that the college can offer. The college cannot promise work for any students, particularly freshmen. It accordingly urges prospective students who are dependent upon their own efforts not to undertake the course before they have enough money to carry them through or nearly through the first year.*

## STUDENT ACCOUNTS.

The following rules are in force concerning student accounts: —

No student will be allowed to graduate until all bills due from him to the institution are paid.

College charges, such as room rent, laboratory fees, tuition, etc., must be paid strictly in advance at the beginning of each semester. No student will be allowed to register until such payments are made.

Every student boarding at Draper Hall shall pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if more than one week in arrears in his payments.

All money due for student labor shall be applied on account toward any bills that the student may owe to the institution.

## LABORATORY FEES.

| | Per Semester. |
|---|---|
| Botany: — | |
| Graduates, | $4 00 |
| Senior year, | 3 00 |
| Junior year, first semester, | 1 00–3 00 |
| Junior year, second semester, | 1 00 |
| Sophomore year, second semester, | 3 00 |
| Chemistry: — | |
| Courses 1, 2, 13 and 14, each, | 3 00 |
| Courses 4, 7, 17 and 18, each, | 4 00 |
| Courses 5, 6, 15, 17, 18A, 18B and 18C, each, | 5 00 |
| Entomology: — | |
| Seniors, | 3 00 |

| | Per Semester. |
|---|---|
| Landscape gardening: — | |
| Senior year, | $4 00 |
| Junior year, | 2 50 |
| Zoölogy: — | |
| Sophomore year, | 2 00 |
| Other years, | 4 00 |

## B. ACADEMIC AND DEPARTMENTAL.

### Degrees.

Those who complete the four-years course receive the degree of bachelor of science. Those who receive this degree may also, upon payment of a fee, receive the degree of bachelor of science (B.Sc.) from Boston University (see page 9); but the candidate must meet the conditions imposed by the university concerning preparatory studies. The fee for graduation from the college is $5; that for the degree of Boston University is $10.

Graduate students who complete the assigned courses will receive the degree of master of science (M.Sc.) (fee, $10). Credit may sometimes be allowed toward this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study and present a satisfactory thesis will be granted the degree of doctor of philosophy (fee, $25).

Those to whom degrees are awarded must present themselves in person at commencement to receive them. Honorary degrees are not conferred.

### Scholarships and Prizes.

#### *Scholarships.*

The income of gifts from different persons is distributed in scholarships to worthy students requiring aid. The funds supporting these scholarships are: —

1. The Mary Robinson fund of $1,000, the bequest of Miss Mary Robinson of Medfield.

2. The Whiting Street fund of $1,000, the bequest of Whiting Street of Northampton.

3. The Henry Gassett fund of $1,000, the bequest of Henry Gassett of North Weymouth.

## *Prizes.*

Prizes are given annually in several departments for excellence in study or for special achievement. The prizes offered for 1910 are: —

AGRICULTURE.— The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

BOTANY. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1911, a prize of $5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

FORESTRY. — The J. W. D. French prize ($25) is given by the Bay State Agricultural Society to that member of the senior class who writes the best essay on forestry.

GENERAL IMPROVEMENT. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character, and example.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, $20 and a gold medal, and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, $15 and a gold medal. The preliminary contests in debate are open, under certain restrictions, to all regular students.

### *Winter Course Prizes for 1910.*

Given by the Bowker Fertilizer Company, Boston, to the student who is most familiar with the nature and composition of fertilizers and their use, one-half ton Stockbridge fertilizer.

### *Military Diplomas.*

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the Department of Military Science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

## EQUIPMENT.

AGRONOMY. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a good surveyor's transit, a wye level and two drainage levels, rods, steel tapes, surveyors' pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

ANIMAL HUSBANDRY. — An important part of the equipment for laboratory work in animal husbandry is the live stock of the college farm, which includes pure-bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach, Percheron and Clydesdale horses, and Berkshire and Yorkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

Chemistry. — The department of chemistry has rooms adapted to chemical uses, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 70 students. Immediately adjoining it are four smaller rooms for apparatus and the preparation of materials for the lecture table. The laboratory for beginners is furnished with 40 working-tables. Each table is provided with reagents and apparatus for independent work. A well-equipped laboratory for advanced work is also provided. The weighing room has 6 balances and improved apparatus for determining densities of solids, liquids and gases. The equipment includes also a microscope, a spectroscope, a polariscope, a photometer, a barometer, numerous models, and an extensive collection of industrial charts, and there is a valuable and growing collection of specimens and samples. The latter includes rocks, minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds. With this should also be mentioned a series of preparations used for illustrating the various stages of different manufactures, from raw material to finished product.

Dairying. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

Dining Hall. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college.

Drawing. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

Entomology. — *Entomological Laboratory.* — The equipment for work in entomology for seniors and for graduate students is unusually good. The laboratory building contains a large room for laboratory work, provided with tables, dissecting and compound microscopes, microtomes, reagents and the usual laboratory implements. One part of the building is fitted up as a lecture room. Another part is devoted to library purposes, and contains a card catalogue of more than 50,000 cards, indexing the literature on insects. Besides the well-selected list of entomological works in this room, there are in the college library an unusual number of rare and valuable books on this subject. These libraries are supplemented by the private libraries of the professors in charge, which contain more than 25,000 volumes, many of which cannot be found elsewhere in the United States. In another room is a large and growing collection of insects, both in the adult and in the early stages. As the laboratory is associated with the insectary of the college experiment station, the facilities of the latter are directly available. The apparatus room of the insectary, with its samples of spray pumps, nozzles and other articles for the practical treatment of insects; the chemical room, fitted for the analysis of insecticides and for other chemico-entomological work; and a greenhouse where plants infected with injurious insects are under continual observation and experimental treatment, are all open to the student; and in addition are provided several private laboratory rooms and a photographing room with an unusually good equipment of cameras. The large greenhouses, grounds, gardens and orchards of the college provide further for study under natural conditions of a wide range of subjects relating to injurious insects.

Farm Administration. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

Floriculture. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of arboriculture.

GEOLOGY. — The teaching in geology is illustrated with a very complete series of minerals, the State collection of rocks of Massachusetts, a series of Ward's fossils and casts of fossils, and models and charts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-years course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for exacting work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library — stack room, reading room and office — occupies the entire lower floor of the library — chapel building. It contains nearly 32,500 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a selected collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS, PHYSICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 2 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

*Physics.* — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, a recitation room, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a model bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

POMOLOGY. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1908–09, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey, and Vermont, besides collections of grapes from California and citrous fruit from Florida and Texas.

PUBLIC SPEAKING. — In connection with the work in public speaking, three contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollege contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the college Debating Club.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, both built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — A large and well-lighted room in the South College is equipped as a zoölogical laboratory. It has the best apparatus, consisting of microscopes, both simple and compound, a microtome, a paraffin bath, an incubator, dissecting instruments and other necessary apparatus. A reference library which includes the current zoölogical and geological journals is kept in this room, and there are ample aquaria in which living aquatic forms may be studied.

The lecture room is a large room in South College. It is supplied with an electric projection lantern, a set of Leuckart charts, various special charts and a complete set of Auzoux models illustrative of human and comparative anatomy. A special set of topical specimens is used for class illustration, and the more extensive museum collection is drawn upon for the same purpose.

The museum is relied on mainly for specimens illustrating the forms treated of in the lecture and the laboratory courses. In addition to this, the aim has been to show as fully as possible the fauna of Massachusetts, and types that show especially the evolution and the relationship of the members of the animal kingdom. The collection consists of more than 11,000 specimens. The museum is open to the public on Saturdays from 1 to 5 P.M. and on other week days from 2.15 to 4.15 P.M. The curator is Assistant Professor Gordon.

## COLLEGE ACTIVITIES.

### *Religious Services.*

Chapel services are held four mornings a week. On Wednesday, instead of chapel an afternoon assembly is held, for which an attempt is made to secure speakers who will present important current subjects. Students are required to attend chapel and assembly.

The Young Men's Christian Association of the college holds a short religious meeting in the chapel on Thursday evenings, and conducts several Bible classes. For part of the year the college and the Y. M. C. A. unite in Sunday vespers, held in the chapel. At vespers a prominent clergyman or layman speaks.

### *Student Organizations.*

A large number of student organizations furnish opportunity for work and leadership to students.

The Massachusetts Agricultural College Social Union has recently been established. All students become members by paying a small fee; the Union is designed to become the center of student interests. It has equipped in North College a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. The Union gives, in the fall and winter months, a series of entertainments, free to the students and faculty.

The Young Men's Christian Association is active both socially and religiously.

The College Senate is composed of representatives of the senior and junior classes. It serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The musical organizations include an orchestra, a glee club, and a quartette. These furnish music for college meetings, and occasionally give concerts. A military band is maintained as part of the cadet corps.

The Athletic Association represents in the college the interests of the football, baseball, basketball, track, hockey and tennis teams.

Among the other clubs are the Mettewampe Club, organized for walking and other outdoor recreation, and a debating club. Provision is made for credit for a specified amount of work done under supervision in the Debating Club, and intercollege debates are held. The Public Speaking Council was organized in March, 1910.

The college publications are the "Signal," published weekly by the student body, the "Index," published annually by the junior class, and "The M. A. C. Literary Monthly," just established.

### *Clubs, Conferences and Seminars.*

The All M. A. C. Chemists is an organization of all persons interested in chemistry who have been connected with the college in the past or are now connected with it. This club, by meetings, lectures, excursions, etc., promotes instruction in practical agricultural chemistry.

The Stockbridge Club is an organization of students specially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

The Language Conference, meeting about once a month, is composed of the instructors in the departments of English and Modern Languages and the students who are enrolled in elective courses in these departments.

A seminar for juniors and seniors is conducted by the division of agriculture. The division of horticulture likewise conducts conferences or seminars.

An entomological club and a zoölogical club are also maintained by those specially interested in these departments of college work.

## HONORS AND AWARDS — 1909.

### *Awards and Prizes.*

GRINNELL PRIZES. — To those members of the senior class who passed the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. First prize, $25, to Benjamin Franklin Barnes, Jr., Haverhill, Mass.; second prize, $15, to Paul Edgar Alger, Reading, Mass.; third prize, $10, to Jared Brewer Thomson, Monterey, Mass.

ENGLISH (PUBLIC SPEAKING) PRIZES. — The Flint prizes to those members of the junior class who delivered the best and second best orations. First prize, $30, to William Clarence Johnson, South Framingham, Mass.; second prize, $20, to Roger Sherman Eddy, Dorchester, Mass. The Burnham prizes to freshmen for excellence in declamation. First prize, $25, to Frank Burrows Hills, Bernardston, Mass.; second prize, $20, to Theodore Joseph Moreau, Turners Falls, Mass.; honorable mention, to Edward Burnham Young, Dorchester, Mass.

ENTOMOLOGICAL PRIZES. — To those seniors who have done the best work in entomology during their course, in accordance with the scale of points prepared by the givers of the prizes. First prize, $20, to Donald John Caffrey, Gardner, Mass.; second prize, $10, to George Melvin Codding, Taunton, Mass.

FORESTRY PRIZES. — Given by the Bay State Agricultural Society as the J. W. D. French prize for the best essay on arboriculture. Twenty-five dollars, to Charles Andrew Oertel, South Hadley Falls, Mass.

GENERAL IMPROVEMENT PRIZE. — Given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character and example. Twenty-five dollars, to Percy William Pickard, Hopedale, Mass.

HILLS BOTANICAL PRIZES. — For the best herbarium, $15, to Waldo Darius Barlow, Amherst, Mass. For the best collection of Massachusetts trees and shrubs, $10, to Waldo Darius Barlow, Amherst, Mass. For the best collection of Massachusetts woods, $10, to Waldo Darius Barlow, Amherst, Mass.

The prize of $5 offered to that member of the freshman class presenting the best herbarium in regular course was awarded to Robert Webster Wales. Honorable mention is made of Edward Hill Bodfish.

### *Military Honors.*

The following officers were reported to the Adjutant-General of the United States and to the Adjutant-General of Massachusetts for their high merit in military work: Maj. Rockwood Chester Lindblad, Capt. Lamert Seymour Corbett, Capt. Henry William Turner, Capt. Richard Chute Potter, Capt. Myron Wood Thompson, Lieut. George Melvin Codding, Lieut. Frederick Chester Warner.

# DEGREES CONFERRED AND ROLL OF STUDENTS.

# DEGREES CONFERRED—1909.

## DOCTOR OF PHILOSOPHY.

Hooker, Charles Worcester, Amherst, A.B., Amherst College, 1906.

## BACHELOR OF SCIENCE (B.Sc.).

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|---|---|
| Alger, Paul Edgar, | Reading. |
| Barlow, Waldo Darius,[1] | Amherst. |
| Barnes, Benjamin Franklin, Jr.,[1] | Haverhill. |
| Bartlett, Oscar Christopher, | Westhampton. |
| Briggs, Orwell Burlton,[1] | Egremont. |
| Brown, George Murray, Jr., | Cambridge. |
| Caffrey, Donald John,[1] | Gardner. |
| Cardin, Patricio Pennaradonda,[1] | *Artemesia, Cuba.* |
| Chase, Edward Irving,[1],[2] | Somerville. |
| Codding, George Melvin,[1],[2] | Taunton. |
| Corbett, Lamert Seymour,[1],[2] | Jamaica Plain. |
| Crosby, Harold Parsons, | Lenox. |
| Crossman, Samuel Sutton,[1],[2] | Needham. |
| Curran, David Aloysius,[1] | Marlborough. |
| Cutler, Homer, | Westborough. |
| Fulton, Gordon Russell, | Lynn. |
| Geer, Myron Francis, | Springfield. |
| Geer, Wayne Emroy, | Springfield. |
| Hathaway, Elmer Francis,[1] | Cambridge. |
| Hsieh, En-Lung,[1] | *Tientsin, China.* |
| Hubbard, Arthur Ward, | Sunderland. |
| Ide, Warren Leroy,[1] | Dudley. |
| Ingalls, Dorsey Fisher, | Cheshire. |
| Jen, Haun,[1] | *Tientsin, China.* |
| Knight, Harry Orrison, | Gardner. |
| Lindblad, Rockwood Chester,[2] | North Grafton. |
| MacGown, Guy Ernestus, | *South Britain, Conn.* |
| Monahan, James Valentine, | South Framingham. |
| Neale, Harold Johnson,[2] | Worcester. |
| Noble, Harold Gordon, | Springfield. |
| Noyes, John,[2] | Roslindale. |
| O'Grady, James Raphael, | Holliston. |
| Oliver, John Thomas, | Dorchester. |
| Phelps, Harold Dwight, | West Springfield. |
| Potter, Richard Chute,[1],[2] | Concord. |
| Putnam, Charles Sumner, | Princeton. |

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[1] Boston University diploma.

[2] Military diploma.

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|---|---|
| Sexton, George Francis,[1] | Worcester. |
| Shamiae, George Mansour, | *Damascus, Syria.* |
| Smulyan, Marcus Thomas, | *New York, N. Y.* |
| Thompson, Myron Wood,[1],[2] | Halifax. |
| Thomson, Jared Brewer,[1] | Monterey. |
| Turner, Henry William,[2] | *Trinidad, Cuba.* |
| Warner, Frederick Chester,[2] | Sunderland. |
| Waters, Theodore Charles, | *Rocky Hill, Conn.* |
| Webb, Charles Russell,[2] | Worcester. |
| Whaley. James Sidney, | *East Orange, N. J.* |
| White, Charles Howard,[1] | *Providence, R. I.* |
| White, Herbert Linwood, | *Evansville, Ind.* |
| Willis, Luther George, | Melrose Highlands. |
| Wilson, Frank Herbert, Jr., | Nahant. |

Total, 50.

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[1] Boston University diploma.

[2] Military diploma.

# ROLL OF STUDENTS.

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## GRADUATE STUDENTS. — CANDIDATES FOR A DEGREE.

| | | |
|---|---|---|
| Bartlett, Oscar Christopher,<br>B.Sc., Massachusetts Agricultural College, 1909. | Westhampton, | R. J. Goldberg's. |
| Caffrey, Donald John,<br>B.Sc., Massachusetts Agricultural College, 1909. | Gardner, | West Experiment Station. |
| Chapman, George Henry,<br>B.Sc., Massachusetts Agricultural College, 1907. | Amherst, | Fearing Street. |
| Davis, Edward Mott,<br>A.B., Harvard, 1909. | Cambridge, | 17 Fearing Street. |
| Davis, Irving Gilman,<br>A.B., Bates, 1906. | *Auburn, Me.*, | 12 North College. |
| Giblin, Edward Michael,<br>A.B., Boston College, 1905. | Holliston, | 15 Gray Street. |
| Holland, Edward Bertram,<br>M.Sc., Massachusetts Agricultural College. | Amherst, | 28 North Prospect Street. |
| Jennison, Harry Milliken,<br>B.Sc., Massachusetts Agricultural College, 1908. | Auburn, | Clark Hall. |
| Johnson, Frederick Andrew,<br>B.Sc., Massachusetts Agricultural College, 1908. | Graniteville, | 84 Pleasant Street. |
| Merrill, Joseph Henry,<br>B.Sc., Dartmouth, 1905. | Danvers, | 9 Fearing Street. |
| Parker, John Robert,<br>B.Sc., Massachusetts Agricultural College, 1908. | *Poquonock, Conn.*, | 96 Pleasant Street. |
| Regan, William Swift,<br>B.Sc., Massachusetts Agricultural College, 1908. | Northampton, | 84 Pleasant Street. |
| Shaw, Jacob Kingsley,<br>B.Sc., University of Vermont, 1899; M.S., Massachusetts Agricultural College, 1908. | Amherst, | 1 Allen Street. |
| Smith, Philip Henry,<br>B.Sc., Massachusetts Agricultural College, 1897. | Amherst, | 102 Main Street. |
| Summers, John Nicholas,<br>B.Sc., Massachusetts Agricultural College, 1907. | Campello, | 66 Pleasant Street. |
| Toppan, Cushing,<br>A.B., Harvard, 1908. | Cambridge, | – – |
| Waters, Theodore Charles,<br>B.Sc., Massachusetts Agricultural College, 1909. | *Rocky Hill, Conn.*, | French Hall. |
| Whitmarsh, Raymond Dean,<br>B.Sc., Massachusetts Agricultural College, 1908, | Amherst, | 102 Pleasant Street. |

Total, 18.

## SENIOR CLASS.

| | | |
|---|---|---|
| Allen, Rodolphus Harold,[1] | Fall River, | 12 South College. |
| Annis, Ross Evered, | Natick, | 14 South College. |
| Armstrong, Robert Pierson, | *Rutherford, N. J.*, | 13 South College. |
| Bailey, Dexter Edward, | Tewksbury, | 88 Pleasant Street. |
| Bailey, Justus Conant,[1] | Wareham, | Theta Phi House. |
| Beeman, Francis Stone, | West Brookfield, | Kappa Sigma House. |
| Blaney, Jonathan Phillips, | Swampscott, | 10 South College. |
| Brandt, Louis,[1] | Everett, | Kappa Sigma House. |

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[1] Work incomplete.

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|---|---|---|
| Brooks, Henry Alvan, | *Cleveland, O.,* | 16 South College. |
| Brooks, Sumner Cushing, | Amherst, | M. A. C. Grounds. |
| Brown, Louis Carmel, | Bridgewater, | 9 South College. |
| Burke, Edward Joseph,[1] | Holyoke, | 9 South College. |
| Clarke, Walter Roe,[1] | *Milton-on-Hudson, N. Y.,* | 4 South College. |
| Cloues, William Arthur, | *Warner, N. H.,* | 7 South College. |
| Cowles, Henry Trask, | Worcester, | Theta Phi House. |
| Damon, Edward Farnham,[1] | Concord Junction, | 18 South College. |
| Dickinson, Lawrence Sumner, | Amherst, | M. A. C. Grounds. |
| Eddy, Roger Sherman, | Dorchester, | 116 Pleasant Street. |
| Everson, John Nelson, | Hanover, | 2 South College. |
| Fisk, Raymond John, | Danvers, | Theta Phi House. |
| Folsom, Josiah Chase, | Billerica, | 10 North College. |
| Francis, Henry Russell, | Dennisport, | 5 South College. |
| French, Horace Wells, | *Pawtucket, R. I.,* | North Amherst. |
| Haynes, Frank Tuttle, | Sturbridge, | 12 South College. |
| Hayward, Warren Willis, | Millbury, | Care of John Walsh. |
| Hazen, Myron Smith, | Springfield, | Veterinary Laboratory. |
| Holland, Arthur Witt, | Shrewsbury, | 12 North College. |
| Hosmer, Charles Irwin,[1] | Turners Falls, | South Dormitory. |
| Johnson, William Clarence, | South Framingham, | 5 South College. |
| Leonard, William Edward,[1] | Belmont, | 10 South College. |
| McLaine, Leonard Septimus, | *New York, N. Y.,* | 4 South College. |
| Mendum, Samuel Weis, | Roxbury, | Theta Phi House. |
| Nickless, Fred Parker, | Billerica, | 10 North College. |
| Oertel, Charles Andrew, | South Hadley Falls, | 14 North College. |
| Partridge, Frank Herbert,[1] | Cambridge, | Clark Hall. |
| Paulsen, George, | *New York, N. Y.,* | 2 South College. |
| Rockwood, Albert Fletcher,[1] | Concord, | 17 South College. |
| Schermerhorn, Lyman Gibbs, | *Kingston, R. I.,* | 11 South College. |
| Thomas, Frank Lincoln, | Athol, | North College. |
| Titus, Willard McCready Snow,[1] | New Braintree, | 16 South College. |
| Turner, Edward Harrison,[1] | Reading, | 6 South College. |
| Urban, Otto Velorous Taft, | Upton, | Kappa Sigma House. |
| Vinton, George Newton, | Sturbridge, | East Pleasant Street, at Mrs. Tripp's house. |
| Waldron, Ralph Augustus, | Hyde Park, | 6 South College. |
| Wallace, William Newton,[1] | Amherst, | 6 Phillips Street. |

Total, 45.

### JUNIOR CLASS.

| | | |
|---|---|---|
| Adams, James Fowler, | Melrose, | 11 South College. |
| Allen, Park West, | Westfield, | 18 South College. |
| Armstrong, Ralph Henry,[1] | Holyoke, | 75 Pleasant Street. |
| Baker, Herbert Jonathan,[1] | *Selbyville, Del.,* | 4 North College. |
| Barrows, Raymond Corbin, | *Stafford Springs, Conn.,* | 16 North College. |
| Bean, Thomas Webster,[1] | South Hadley Falls, | 75 Pleasant Street. |
| Bentley, Arnold Gordon,[1] | Hyde Park, | 3 North College. |
| Blaney, Herbert Wardwell, | Swampscott, | Tower, South College. |
| Brown, Edgar Morton, | Springfield, | 96 Pleasant Street. |
| Burnham, Arthur James,[1] | Holyoke, | 75 Pleasant Street. |
| Bursley, Allyn Parker, | West Barnstable, | Theta Phi House. |
| Conant, Arthur Theodore, | Sunderland, | Brooks House. |
| Damon, Charles Murray,[1] | Haydenville, | 20 South College. |
| Davis, Egbert Norton, | South Framingham, | 7 North College. |
| Davis, Irving Wilder, | Lowell, | Insectary. |
| Drury, Harold Blake, | Athol, | 6 North College. |
| Dudley, John Edward, Jr.,[1] | Newton Center, | 11 North College. |
| Gilgore, Irvin Craig, | *Schenectady, N. Y.,* | 3 North College. |
| Henry, Willard Francis,[1] | Hopedale, | Theta Phi House. |
| Hill, Nathaniel Herbert,[1] | *Glenmore, N. J.,* | 17 South College. |
| Howe, Harold Hosmer,[1] | Springfield, | Wilder Hall. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Jenks, Albert Roscoe,[1] | Three Rivers, | Plant House. |
| Johnson, Leonard Matthews,[1] | Easthampton, | 2 North College. |
| Labouteley, Gaston Edward,[1] | Lynn, | 101 Pleasant Street. |
| Larrabee, Edward Arthur,[1] | Winthrop, | Clark Hall. |
| Lodge, Charles Albert,[1] | Manchester, | 87 Pleasant Street. |
| McGraw, Frank Dobson,[1] | Fall River, | 15 North College. |
| McLaughlin, Fredrick Adams, | Lee, | 4 North College. |
| Morse, Henry Bowditch,[1] | Salem, | 75 Pleasant Street. |
| Nagai, Isaburo, | *Tokyo, Japan,* | 9 North College. |
| Nickerson, George Payne, | Amherst, | East Experiment Station. |
| Nielsen, Gustaf Arnold,[1] | West Newton, | 15 North College. |
| Ostrolenk, Bernard,. | *Gloversville, N. Y.,* | 9 North College. |
| Parsons, Samuel Reynolds, | North Amherst, | North Amherst. |
| Patch, Roland Harrison,[1] | Wenham, | 35 North Prospect Street. |
| Pauly, Herman Alfred, | Somerville, | Nash Hall. |
| Pickard, Percy William, | Hopedale, | 18 North College. |
| Piper, Ralph Waldo,[1] | South Acton, | 8 North College. |
| Prouty, Frank Alvin,[1] | Worcester, | Miss Allen's, Snell Street. |
| Prouty, Philip Herman, | Shrewsbury, | West Experiment Station. |
| Racicot, Philias Armand, | Lowell, | 15 South College. |
| Robinson, Ralph Cushing,[1] | Boston, | 7 North Dormitory. |
| Sharpe, Arthur Harris, | Saxonville, | Kappa Sigma House. |
| Smith, Clarence Albert,[1] | Northampton, | 8 North College. |
| Smith, Raymond Goodale,[1] | Lynn, | 3 Fearing Street. |
| Stevenson, Lomas Oswald, | *Hackensack, N. J.,* | 87 Pleasant Street. |
| Warren, Edward Irving, | Leicester, | 13 South College. |
| Whitney, Raymond Lee, | Brockton, | 6 Maple Avenue. |
| Willard, Harold Francis, | Leominster, | Plant House. |
| Winn, Ervin Lawrence, | Holden, | 87 Pleasant Street. |

Total, 50.

### SOPHOMORE CLASS.

| | | |
|---|---|---|
| Ackerman, Arthur John, | Worcester, | 5 McClellan Street. |
| Beals, Carlos Loring, | Sunderland, | Brooks House. |
| Beers, Rowland Trowbridge,[1] | Billerica, | West Experiment Station. |
| Bent, William Richard,[1] | Marlborough, | Lover's Lane, The Bungalow. |
| Birdsall, Webster Jennings,[1] | *Otego, N. Y.,* | 28 Lincoln Avenue. |
| Bodfish, Edward Hill, | West Barnstable, | 6 Phillips Street. |
| Boland, Eric Nichols, | South Boston, | 13 Fearing Street. |
| Brett, Alden Charles, | North Abington, | Kappa Sigma House. |
| Brown, Merle Raymond,[1] | Greenwich Village, | 60 College Street. |
| Burr, Frederick Huntington,[1] | Worthington, | 21 Fearing Street. |
| Cabot, George Dwight, | Winchester, | 79 Pleasant Street. |
| Caldwell, Lawrence Sanborn, | Lynn, | Kappa Sigma House. |
| Carpenter, Jesse, Jr.,[1] | Attleborough, | Kappa Sigma House. |
| Castle, Fred Arlo, | *Kansas City, Mo.,* | East Experiment Station. |
| Clapp, Raymond Kingsley, | Westhampton, | 20 North College. |
| Curran, Daniel Joseph, | Marlborough, | East Pleasant Street. |
| Daniel, Edward Stephen Coen, | Osterville, | 9 Fearing Street. |
| Dee, John Francis,[1] | Worcester, | 6 Nutting Avenue. |
| Deming, Winfred Griswold, | *Wethersfield, Conn.,* | 6 Nutting Avenue. |
| Dodge, Albert Wesley, | Wenham, | Mr. Walker's. |
| Eisenhaure, John Louis,[1] | North Reading, | Nutting Avenue. |
| Ells, Gordon Waterman, | Cambridge, | 44 Triangle Street. |
| Fagerstrom, Leon Emanuel, | Worcester, | East Pleasant Street. |
| Fisherdick, Warren Francis,[1] | Amherst, | 26 South Pleasant Street. |
| Fitts, Frank Orus,[1] | North Amherst, | Care of Luther Root. |
| Fitzgerald, John Joseph, | Holyoke, | 33 Elm Street, Holyoke, Mass. |
| Fowler, George Scott,[1] | Wayland, | 85 Pleasant Street. |
| Frost, John Newton,[1] | Natick, | 77 Pleasant Street. |
| Gallagher, James Andrew,[1] | North Wilmington, | 85 Pleasant Street. |
| Gaskill, Lewis Warren, | Hopedale, | R. J. Goldberg's. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Gelinas, Louis Edmund, | North Adams, | 75 Pleasant Street. |
| Gibbs, Robert Morey,[1] | Chester, | Brooks Farm. |
| Gibson, Lester Earle,[1] | Melrose, | 85 Pleasant Street. |
| Gray, Frank Leonard, | East Boston, | 21 Fearing Street. |
| Hallowell, Royal Norton, | Jamaica Plain, | Kappa Sigma House. |
| Harlow, Joseph Alvin, | Turners Falls, | Kappa Sigma House. |
| Heald, Jay Morrill, | Watertown, | 2 North College. |
| Hemenway, Thomas, | Winchester, | West Experiment Station. |
| Hills, Frank Burrows, | Bernardston, | 8 South College. |
| Hickey, Francis Benedict, | Brockton, | 5 McClellan Street. |
| Holland, Henry Lucius, | Amherst, | 28 North Prospect Street. |
| Hutchings, Herbert Colby, | South Amherst, | E. H. Forristall's. |
| Kingsbury, Arthur French, | Medfield, | 20 North College. |
| Lamson, Robert Ward, | Amherst, | 51 Pleasant Street. |
| Lin, Dau Yang, | *Shanghai, China,* | 21 Fearing Street. |
| Lloyd, Edward Russell,[1] | Boston, | 3 Nutting Avenue. |
| Lowry, Quincy Shaw,[1] | Canton, | 85 Pleasant Street. |
| Lundgren, Arthur Robert, | Orange, | Theta Phi House. |
| Madison, Francis Spink, | *East Greenwich, R. I.,* | 12 Cottage Street. |
| Martin, James Francis, | Amherst, | 19 South East Street. |
| Maxon, Donald Charles,[1] | *Elkhart, Ind.,* | Sunset Avenue. |
| McGarr, Thomas Anthony, | Worcester, | 31 East Pleasant Street. |
| Merkle, George Edward, | Amherst, | East Street. |
| Merrill, Fred Sawyer, | Danvers, | 9 Fearing Street. |
| Moreau, Theodore Joseph, | Turners Falls, | 1 North College. |
| Muller, Alfred Frederick, | Jamaica Plain, | 31 East Pleasant Street. |
| Noyes, Harry Alfred, | Marlborough, | Plant House. |
| O'Flynn, George Bernhard, | Worcester, | 75 Pleasant Street. |
| Parker, Ralph Robinson, | Malden, | 13 North College. |
| Pearson, Charles Cornish, | Arlington, | 6 North College. |
| Peckham, Curtis, | Clifford, | 1 North College. |
| Philbrick, William Edwin, | Taunton, | 5 North College. |
| Pierpont, John Edward, | Williamsburg, | 6 Nutting Avenue. |
| Pratt, Marshall Cotting, | Lowell, | 85 Pleasant Street. |
| Puffer, Stephen Perry, | North Amherst, | North Amherst. |
| Raymond, Arthur Nathaniel, | Leominster, | 31 East Pleasant Street. |
| Reed, Robert Edward, | Abington, | Theta Phi House. |
| Roberts, Clarence Dwight,[1] | *New Haven, Conn.,* | 10 Allen Street. |
| Robinson, Earle Johnson,[1] | Hingham, | 116 Pleasant Street. |
| Rockwood, Lawrence Peck, | *Waterbury, Conn.,* | 116 Pleasant Street. |
| Sanctuary, William Crocker,[1] | Amherst, | Mill Valley. |
| Sellew, Lewis Raymond, | Natick, | Brooks Farm. |
| Shaw, Ezra Ingram, | Amherst, | 8 Spaulding Street. |
| Southwick, Benjamin Gilbert, | Buckland, | 82 Pleasant Street. |
| Stack, Herbert James, | Conway, | Pleasant Street. |
| Terry, Leon, | Springfield, | 101 Pleasant Street. |
| Torrey, Ray Ethan, | North Leverett, | East Pleasant Street. |
| Tower, Daniel Gordon, | Roxbury, | 14 North College. |
| Tupper, George Wilbur, | Jamaica Plain, | 13 North College. |
| Turner, Howard Archibald, | Dorchester, | East Pleasant Street. |
| Wales, Robert Webster, | North Abington, | Kappa Sigma House. |
| Walker, Herman Chester, | Marlborough, | Brooks Farm. |
| Warner, Roger Andrew,[1] | Sunderland, | E. H. Forristall's. |
| Weaver, William Jack, | Alandar, | 10 Allen Street. |
| Whitney, Charles Everett, | Wakefield, | Walker's Hall. |
| Wilbur, Emory Sherman, | East Wareham, | Walker's Hall. |
| Wilde, Earle Irving, | Taunton, | Kappa Sigma House. |
| Williams, Edward Roger, | Concord, | 116 Pleasant Street. |
| Williams, Silas, | Fall River, | Theta Phi House. |
| Wood, Howard Holmes, | Shelburne Falls, | 79 Pleasant Street. |
| Young, Edwin Burnham,[1] | Dorchester, | 5 Fearing Street. |

Total, 91.

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[1] Work incomplete.

## Freshman Class.

| | | |
|---|---|---|
| Adams, Winford Frederick, | East Leverett, | 2 Allen Street. |
| Allen, Harry Willis, | West Pelham, | West Pelham. |
| Ames, Francis Leslie, | Cochituate, | 101 Pleasant Street. |
| Anderson, Oscar Gustaf, | East Pepperell, | 85 Pleasant Street. |
| Angier, Harris William, | Westborough, | 77 Pleasant Street. |
| Baird, Harry Albert, | Somerville, | 6 Phillips Street. |
| Baker, Dean Foster, | New Bedford, | Brooks Farm. |
| Baker, Horace Mitchell, | *Selbyville, Del.*, | North College. |
| Baker, Warren Sears, | Wollaston, | 75 Pleasant Street. |
| Barber, George Ware, | Franklin, | 116 Pleasant Street. |
| Blake, Ralph Cedric, | Wollaston, | 75 Pleasant Street. |
| Borden, Ralph James, | Fall River, | 1 Allen Street. |
| Bradley, John Watling, | Groton, | Care of Larned, Pleasant Street. |
| Brewer, Charlesworth Herbert, | *Mt. Vernon, N. Y.*, | Care of Henry Nash, Pleasant Street. |
| Brown, Herbert Augustine, | Saxonville, | Brooks Farm. |
| Bullard, Alvan Henry, | South Framingham, | 75 Pleasant Street. |
| Burby, Lawrence Walter, | Chicopee Falls, | 19 Hallock Street. |
| Bursley, Harold Barrows, | Peabody, | 44 Triangle Street. |
| Caldwell, David Story, | South Byfield, | East Experiment Station. |
| Carver, John Stuart, | Roslindale, | 15 Fearing Street. |
| Chun, Woon Young, | *Shanghai, China*, | 90 Pleasant Street. |
| Clark, Norman Russell, | Worcester, | 66 Pleasant Street. |
| Clegg, Frank Jackson, | Fall River, | 6 Kellogg Avenue. |
| Cleveland, Waldo Atwood, | Baldwinville, | 14 Kellogg Avenue. |
| Cobb, Joseph Boyd, | Chicopee Falls, | 84 Pleasant Street. |
| Cole, Arlin Tower, | West Chesterfield, | 3 Fearing Street. |
| Coleman, Isaac, | Boston, | 8 Walnut Street. |
| Cooper, Everett Hanson, | Greenwood, | Walker Hall. |
| Cory, Harold, | *Rutherford, N. J.*, | 82 Pleasant Street. |
| Cowles, Winfred Phelps, | North Hadley, | North Hadley. |
| Covill, Joseph Warren, | West Roxbury, | Brooks Farm. |
| Cristman, Clyde Edward, | Dalton, | 44 Triangle Street. |
| Currier, Richard Henry, | *Pelham, N. H.*, | 17 Fearing Street. |
| Curtis, Harold William, | Belchertown, | Belchertown. |
| Dayton, James Wilson, | *South Norwalk, Conn.*, | 25 College Street. |
| Dohanian, Senekerim Mardiros, | Somerville, | 5½ East Pleasant Street. |
| Dooley, Thomas Patrick, | South Boston, | 12 Hallock Street. |
| Dowd, Daniel Guilford, | North Amherst, | North Amherst. |
| Drury, Lewis Floyd, | Rutland, | 12 East Pleasant Street. |
| Edminster, Albert Franklin, | *Brooklyn, N. Y.*, | Mount Pleasant. |
| Ellis, Benjamin Ward, | Plymouth, | 120 Pleasant Street. |
| Everson, Leon Walter, | Bryantville, | 44 Triangle Street. |
| Fay, Robert Sedgwick, | Monson, | 120 Pleasant Street. |
| Finnegan, John Thomas, | Forest Hills, | – – |
| Forbush, Wallace Clifford, | Rutland, | 13 East Pleasant Street. |
| Freifeld, Joseph, | New Bedford, | 8 Walnut Street. |
| French, James Dudley, | Hyde Park, | 116 Pleasant Street. |
| Fuller, George, | Deerfield, | Amity Street, corner of Lincoln Avenue. |
| Gaskill, Ralph Hicks, | Worcester, | Brooks Farm. |
| Godvin, Thomas Joseph, | Jamaica Plain, | 35 East Pleasant Street. |
| Goodenough, Henry Edward, | Wilbraham, | 85 Pleasant Street. |
| Gore, Harold Martin, | Wollaston, | 75 Pleasant Street. |
| Greenleaf, George Freeman, | Brockton, | 21 Fearing Street. |
| Griffin, William Gerald, | South Hadley Falls, | 35 East Pleasant Street. |
| Griggs, Frederick David, | Chicopee Falls, | 84 Pleasant Street. |
| Guild, Louis Franklin, | *Swanton, Vt.*, | E. H. Forristall's. |
| Harrington, Russell Chase, | Taunton, | 58 Pleasant Street. |
| Harris, Burton Adams, | *Wethersfield, Conn.*, | 66 Pleasant Street. |

| | | |
|---|---|---|
| Hasey, Willard Harrison, | Brockton, | 5 McClellan Street. |
| Hatch, Herbert Tilden, | Norwell, | Walker Hall. |
| Hayden, William Vassall, | Beverly, | 3 McClellan Street. |
| Headle, Herbert Wallace, | Bolton, | A. P. Dings. |
| Headle, Marshall, | Bolton, | Care of A. P. Dings. |
| Heath, Chester Blanchard, | Needham, | E. H. Forristall's. |
| Helberg, Henry William, | Lawrence, | 29 McClellan Street. |
| Holden, James Loomis, | Palmer, | 85 Pleasant Street. |
| Howe, Glover Elbridge, | Marlborough, | 75 Pleasant Street. |
| Howe, Ralph Wesley, | *East Dover, Vt.*, | 85 Pleasant Street. |
| Howlett, Loring Chandler, | Brimfield, | – – |
| Hubbard, Roswell Earle, | Hatfield, | Wm. Dudley's, Lincoln Avenue. |
| Huntington, Samuel Percy, | Lynn, | 19 Pleasant Street. |
| Hurley, Charles Andrew, | Brockton, | 5 McClellan Street. |
| Hutchison, Robert B., | Somerville, | Pleasant Street. |
| Hyland, Harold Wilson, | Weymouth, | 44 Pleasant Street. |
| Jenks, Harold Edmands, | Worcester, | 15 Fearing Street. |
| Jenney, Herbert Hedge, | South Boston, | 1 Allen Street. |
| Jones, Harold Frederick, | Campello, | 5 McClellan Street. |
| Jordan, Simon Miller, | *Rutherford, N. J.*, | 82 Pleasant Street. |
| Kelley, Albert Joseph, | Roxbury, | 35 East Pleasant Street. |
| Kelley, Bernard Jenkins, | Harwich, | 116 Pleasant Street. |
| Kenney, Frederick Alfred, | Charlestown, | 77 Pleasant Street. |
| Kinney, Warren Clinton. | *West Bridgewater, Conn.*, | 120 Pleasant Street. |
| Lake, James Edward, | Fall River, | Corner of Amity Street and Lincoln Avenue. |
| Lane, William Francis, | Leominster, | 85 Pleasant Street. |
| Larsen, Nils Paul, | *Bridgeport, Conn.*, | 3 McClellan Street. |
| Lesure, John Warren Thos., | Lunenburg, | 44 Pleasant Street. |
| Little, Willard Stone, | Newburyport, | 120 Pleasant Street. |
| Lyon, Harold, | Somerville, | 79 Pleasant Street. |
| Macone, Joseph Augustine, | Concord, | 116 Pleasant Street. |
| Mallett, George Alfred, | *Bridgeport, Conn.*, | 3 McClellan Street. |
| Marsh, Frank Eugene, | Jefferson, | Brooks Farm. |
| Matz, Julius, | Boston, | 16 Pleasant Street. |
| Mayer, John Lawrence, | South Boston, | 35 East Pleasant Street. |
| McDougall, Allister Francis, | Westford, | Brooks Farm. |
| Milbury, Freeman Cyril, | Lynn, | 3 McClellan Street. |
| Miller, Harold Harrington, | Needham, | E. H. Forristall's. |
| Moir, William Stuart, | Boston, | 3 McClellan Street. |
| Neal, Ralph Thomas, | Mattapan, | 120 Pleasant Street. |
| Nichols, Norman Joseph, | Everett, | Care of Mrs. L. H. Taylor, North Amherst. |
| O'Brien, James Leo, | Wayland, | 101 Pleasant Street. |
| Packard, Clyde Monroe, | Springfield, | 85 Pleasant Street. |
| Parsons, Robert, | Lynn, | 29 McClellan Street. |
| Patch, Roy Killam, | Beverly, | 3 McClellan Street. |
| Pease, Lester Newton, | *Meriden, Conn.*, | 120 Pleasant Street. |
| Pellett, John Doubleday, | Worcester, | 66 Pleasant Street. |
| Peters, Thomas Harrison, | North Truro, | 77 Pleasant Street. |
| Pillsbury, Joseph James, | West Bridgewater, | 21 Fearing Street. |
| Post, George Atwell, | *Richmond Hill, N. Y.*, | Theta Phi House. |
| Prouty, Roy Henry, | Worcester, | Miss Allen's, Snell Street. |
| Putnam, Earl Francis, | Easthampton, | 58 Pleasant Street. |
| Quinn, Joseph Henry, | Boston, | 6 Kellogg Avenue. |
| Roehrs, Herman Theodore, | *New York, N. Y.*, | 85 Pleasant Street. |
| Rose, Stephen Darwin, | Clifton, | 29 McClellan Street. |
| Rosebrooks, Walter Edwin, | Millbury, | 35 East Pleasant Street. |
| Ryder, Harold Whitman, | East Boston, | 21 Fearing Street. |
| Samson, Stuart Dodge, | *Grand Isle, Vt.*, | 19 Phillips Street. |
| Serex, Paul, Jr., | Jamaica Plain, | 35 East Pleasant Street. |
| Shea, John Lawrence, | Amherst, | 22 McClellan Street. |
| Sheehan, Dennis Anthony, | South Lincoln, | 116 Pleasant Street. |

| | | |
|---|---|---|
| Shute, Carl August, | *Clayton, Ill.,* | 9 High Street. |
| Smart, Herbert Leighton, | Framingham, | Brooks Farm. |
| Staab, Harold Burton, | Northampton, | 85 Pleasant Street. |
| Streeter, Charles Marsh, | Brimfield, | 35 East Pleasant Street. |
| Thayer, Clark Leonard, | Enfield, | 77 Pleasant Street. |
| Tucker, Waldo Guy, | Lynn, | 19 Pleasant Street. |
| Tupper, Arthur Somerville, | Jamaica Plain, | 11 Fearing Street. |
| Turner, Leon Bennett, | North Abington, | 2 Allen Street. |
| Van Zwaluwenburg, Ryer Herman, | *Rutherford, N. J.,* | 66 Pleasant Street. |
| Walker, Charles Dexter, | Greenwich Village, | 120 Pleasant Street. |
| Wheeler, Henry Leslie, | Salem, | 19 Pleasant Street. |
| Wheeler, Merrill Halladay, | Rutland, | 56 South Pleasant Street. |
| Whitman, Warren Clifford, | Abington, | 2 Allen Street. |
| Whitney, Francis Wellington, | Needham, | E. H. Forristall's. |
| Zabriskie, George, 2d, | *Rutherford, N. J.,* | 82 North Pleasant Street. |

Total, 134.

### UNCLASSIFIED STUDENTS. — NOT CANDIDATES FOR A DEGREE.

| | | |
|---|---|---|
| Barstow, Harold Dunbar, | Hadley, | North Amherst. |
| Critchett, Edward Russell, | Watertown, | 120 Pleasant Street. |
| DeMott, Henry Vroom, | *Metuchen, N. J.,* | 2 Allen Street. |
| Gilmore, Howard Pool, | Waban, | 2 Allen Street. |
| Granger, Helen, | Amherst, | Draper Hall. |
| Greene, William Allan, | Elmwood, | Mt. Pleasant. |
| Hammond, Arthur Augustus, | *Bridgeport, Conn.,* | 12 Kellogg Avenue. |
| Hawkins, Guy Carleton, | Lancaster, | 66 Pleasant Street. |
| Lew, Gerard Nelson, | Lowell, | 19 North Pleasant Street. |
| MacDonald, George Francis, | Medford, | – – |
| Powers, Richard Henry, | Malden, | 11 South College. |
| Roberts, Charles Elliott, | Amherst, | – – |

Total, 12.

## SHORT COURSE STUDENTS.

### *Summer School Students — 1909.*

| | |
|---|---|
| Abercrombie, Rev. R. H., | Windsor. |
| Adams, Lena R., | North Brookfield. |
| Alden, L. F., | Amherst. |
| Allen, Rev. Geo. E., | Williamstown. |
| Anderson, Mrs. W. L., | Amherst. |
| Averill, Eugene, | Rockport. |
| Bachelder, Grace D., | Boston. |
| Barton, Alice M., | West Roxbury. |
| Bates, Martha P., | Cohasset. |
| Beers, Rev. Charles H., | *Bantam, Conn.* |
| Belcher, S. Elizabeth, | Worcester. |
| Berry, E. K., | Cambridge. |
| Berry, J. G., | Cambridge. |
| Berry, Carl, | Cambridge. |
| Bigelow, Charles, | *Hinsdale, N. H.* |
| Boston, L. B., | *Biddeford, Me.* |
| Bray, Maud J., | Dorchester. |
| Britt, Emma, | South Boston. |
| Bristol, Elizabeth D., | Dana. |
| Brooks, Laura J., | Stoneham. |
| Burgess, Louisa W., | Dorchester Center. |

| | |
|---|---|
| Busfield, Dr. T. E., | North Adams. |
| Callahan, Mary A., | Worcester. |
| Callender, Gertrude, | Northfield. |
| Carley, Lillian M., | *New York City, N. Y.* |
| Chace, S. Howard, | Lowell. |
| Chaney, Florence A., | Boston. |
| Chapin, Rev. C. H., | Phillipston. |
| Cheney, Hazel Chase, | Amherst. |
| Childs, Rev. James H., | Marion. |
| Churbuck, Bessie L., | East Wareham. |
| Connors, Thomas F. L., | Jefferson. |
| Coolidge, Kate A., | South Boston. |
| Cotta, Florence L., | Worcester. |
| Craig, T. C., | *Wethersfield, Conn.* |
| Cunningham, M. E., | Worcester. |
| Dacey, J. G., | Dorchester. |
| Davis, Carrie I., | Taunton. |
| Davis, Ethel G., | Allston. |
| Davis, Mrs. Sarah J., | Stoneham. |
| Day, Geo. W., | Lynn. |
| Day, Mrs. Geo. W., | Lynn. |
| Dearborn, Helen M., | Brockton. |
| DeMott, Henry V., | *Metuchen, N. J.* |
| Diman, Elizabeth G., | Holbrook. |
| Dooley, Rev. John, | New Boston. |
| Dorntee, M. Louise, | Malden. |
| Doty, Alice Lincoln, | Wareham. |
| Drury, Susan F., | Everett. |
| Dudley, Gertrude E., | Dorchester. |
| Dunlap, Jennie M., | Webster. |
| Durfee, Lydia S., | *Providence, R. I.* |
| Eastwood, Wm. Firth, | Roxbury. |
| Eastwood, Mrs. Wm. F., | Roxbury. |
| Eaton, Luella, | Needham Heights. |
| Ells, Laura A., | Roxbury. |
| Faber, Andrew J., | East Boston. |
| Farnam, Leah B., | Malden. |
| Flaherty, Joseph L., | Hudson. |
| Flaherty, Margaret A., | Worcester. |
| Flynn, Elizabeth C., | Malden. |
| Fogg, Rev. Charles G., | West Tisbury. |
| Foley, Ellen L., | Raynham Center. |
| Freese, E. P., | Granby. |
| French, Geo. W., | Deerfield. |
| Fuller, Rev. M. J. B., | Plainfield. |
| Gould, Ella F., | Brockton. |
| Graham, Rev. John, | Warwick. |
| Granger, Helen, | Amherst. |
| Grant, Mrs. Vera A., | Lawrence. |
| Graves, Bessie M., | Southampton. |

| | |
|---|---|
| Gray, J. C., | *Saco, Me.* |
| Greene, H. D., | *Newport, R. I.* |
| Gushee, W. E., | Ludlow. |
| Gustin, Rev. F. B., | North Amherst. |
| Habberley, Rev. R. C., | Otis. |
| Hadley, Mary E., | Arlington Heights. |
| Hall, Rev. Charles H., | Wakefield. |
| Hall, George Anthony, | Monterey. |
| Hall, Lubelle M., | *Warren, Me.* |
| Hardon, Henry C., | Newton. |
| Harrington, Alona, | Malden. |
| Haskell, Mabelle W., | Lynn. |
| Hayes, Warren C., | *Durham, N. H.* |
| Hills, Mrs. Alice T., | Amherst. |
| Hills, Susan C., | Amherst. |
| Hoagland, Rev. N. S., | Tyngsborough. |
| Hogan, Elizabeth H., | *Unionville, Conn.* |
| Hopkins, Elizabeth, | Winchester. |
| Howard, Alice M., | Taunton. |
| Howard, Annie G., | Taunton. |
| Jeannerett, Georgina, | *Mt. Vernon, N. Y.* |
| Jenkins, Elizabeth C., | Sandwich. |
| Jones, Rev. Gustavus W., | Winchendon. |
| Kendrick, Jean, | Amherst. |
| Keyes, M. R., | *Kezar Falls, Me.* |
| Kirby, Lilla B., | Wellesley Hills. |
| Landmann, Florence E., | *Oradell, N. J.* |
| Lawton, Walter B., | Athol. |
| Leanard, Mrs. Maude B., | Dorchester. |
| Lewis, John B., | Huntington. |
| Lewis, Mrs. John B., | Huntington. |
| Lewis, Lillian K., | Boston. |
| Lewis, Martha A., | Boston. |
| Lockwood, Bertha, | Southfield. |
| Lockwood, Jennie P., | Southfield. |
| Luetge, Mrs. Margaret Werner, | Mattapan. |
| Lutterman, Rev. E. W., | Easthampton. |
| MacIntyre, Katherine, | Provincetown. |
| Mason, Carrie L., | Winchester. |
| Mason, Isadore Helen, | Gardner. |
| Mattson, W. Frank, | Boston. |
| Mattson, Mrs. W. Frank, | Boston. |
| Mattson, Wm. R., | Brookline. |
| Mead, Ella, | *Brooklyn, N. Y.* |
| Miller, Susie T., | Brockton. |
| Monk, Anna C., | Stoughton. |
| Moulton, Rev. J. W., | Northbridge Center. |
| Mowry, Mary E., | Bernardston. |
| Mulcahey, Bridget T., | *Hartford, Conn.* |
| Munroe, Donald M., | *Huntington, N. Y.* |

| | |
|---|---|
| Murray, E. Francis, | Cambridge. |
| Murray, Florence H., | Cambridge. |
| Neal, Josephine B., | Taunton. |
| Newell, Gordon, | *Millersville, N. Y.* |
| Newhall, Mrs. Agnes C., | South Boston. |
| Newhall, Laura L., | South Boston. |
| Newport, Edw. F., | Amherst. |
| O'Donnell, Nellie, | *Bridgeton, N. J.* |
| Olds, Rosabelle M., | Belchertown. |
| Parsons, Sally, | Lynn. |
| Partch, Arthur W., | Stoneham. |
| Pennell, Jennie, | *Westbrook, Me.* |
| Pennell, Mary E., | *Westbrook, Me.* |
| Pethybridge, Chas. E., | Marion. |
| Poore, Harriet P., | Boston. |
| Poore, Mary E., | Brockton. |
| Post, Edna A., | *Gilead, Conn.* |
| Price, Wm. G., | *Cappahosic, Va.* |
| Redding, Charlott W., | Amherst. |
| Reynolds, Sybil W., | *Cumberland Head, Plattsburg, N. Y.* |
| Riggs, E. J., | *North Carver.* |
| Roberts, Ella L., | Cushman. |
| Robinson, Mrs. Alice M., | South Boston. |
| Robinson, P. J., | *Littleton, N. H.* |
| Ross, Mrs. Helen A., | Brookline. |
| Rossiter, Irmagarde, | *Hartford, Conn.* |
| Rowe, Joseph, | Mattapan. |
| Rowe, Mildred, | Amherst. |
| Roy, Clista, | Amherst. |
| Sampson, Mrs. F. D., | Newton. |
| Sanborn, A. L., | Boston. |
| Sears, J. W., | *Watha, N. C.* |
| Shipee, Lydia A., | *Providence, R. I.* |
| Spinney, N. B., | Townsend. |
| Spooner, Rev. L. C., | New Marlborough. |
| Starr, Mrs. L. R., | Pepperell. |
| Sullivan, Jane, | Worcester. |
| Swing, Ella, | *Bridgeton, N. J.* |
| Teele, Helen M., | Arlington. |
| Tobin, Ellen Caroline, | Lawrence. |
| Torrey, E. E., | Boston. |
| Towne, Mrs. Mary E., | Amherst. |
| Trowbridge, Anna B., | Fairhaven. |
| Tucker, Edward M., | West Newbury. |
| Tufts, Mary I., | Lynn. |
| Verder, Bessie Clarinda, | Fairhaven. |
| Verder, Blanche A., | *Providence, R. I.* |
| Viets, Rev. F. H., | West Acton. |
| Waugh, Dorothy, | Amherst. |
| Whitcomb, Mrs. Henry F., | Amherst. |

| | |
|---|---|
| White, Rev. Ralph H., | Cummington. |
| Whittaker, B. E., | *LeRoy, N. Y.* |
| Whittaker, Mrs. B. E., | *LeRoy, N. Y.* |
| Williams, Winnie M., | Beverly. |
| Yard, Julia A., | Sandwich. |

Total, 176.

### *Winter Course Students — 1910.*

| | |
|---|---|
| Alcock, James Richard, | North Amherst. |
| Baggs, Milton Charles, | Belchertown. |
| Bahsler, Eugene, | Dunstable. |
| Barnes, Joseph C., | Lanesborough. |
| Belknap, Robert Sidney, | Amherst. |
| Bowditch, John P., | Framingham. |
| Bowser, Lydia Animia, | Cohasset. |
| Bradstreet, Albert C., | Topsfield. |
| Canlett, Thomas Griffith, | Rockport. |
| Clark, Emerson Leland, | *Milford, Conn.* |
| Channing, Hayden, | Sherborn. |
| Childs, Samuel Wellington, | Deerfield. |
| Cordes, Edward, | Great Barrington. |
| Cox, Harold Childs, | Wakefield. |
| Curtis, Elliot D., | *Bantam, Conn.* |
| Day, Harry Ney, | West Stockbridge. |
| Dow, Aaron William, | Bolton. |
| Dunn, Howard Waterman, | Dorchester. |
| Eastwood, John Robert, | North Adams. |
| Edmands, Thomas Roland, | Newton. |
| Gage, Earl Lyman, | *Gilbertville, N. Y.* |
| Gray, George Arthur, | Beverly. |
| Harris, George Browning, | North Adams. |
| Holcomb, Edmund Alfred, | *Simsbury, Conn.* |
| Hurd, Robert Otis, | Westminster. |
| Kenney, Ralph Hewes, | *Greenwich, N. Y.* |
| Ketchen, Harold Barnett, | Belchertown. |
| Killam, John, | East Boxford. |
| Koch, Mabel Tyler (Mrs.), | *Bloomfield, Conn.* |
| Lanier, Sidney, | Walpole. |
| Lemoine, Arthur Alfred, | South Framingham. |
| Lewis, Albert, | *East Rockaway, N. Y.* |
| Marsh, Howard Clifton, | Arlington. |
| Maurer, Frank Julius, | Newton. |
| McCarroll, Edward Loomis, | Waban. |
| McIntyre, George Henderson, | Easthampton. |
| O'Donnell, James Curran, | Belchertown. |
| Pardee, Edwin Curtis, | Bolton. |
| Pease, Willard Morris, | Monson. |
| Peck, Harold Frederick, | Belchertown. |
| Perham, John Franklin, | Ludlow Center. |
| Priest, Frederick Stimpson, | Watertown. |

| | |
|---|---|
| Puffer, Willis Reynolds, | Concord. |
| Sabine, George Kraus, Jr., | Brookline. |
| Sanderson, Leon Benjamin, | Williamsburg. |
| Scace, William, | Pittsfield. |
| Scott, Edwin Gould, | *Garfield, Wash.* |
| Searle, Edward, | Southampton. |
| Seaver, John Dwight, | *New Britain, Conn.* |
| Selkregg, Edwin Reimund, | *North East, Pa.* |
| Shaughnessy, Thomas Francis, | Marlborough. |
| Smith, John Anderson, | South Westport. |
| Smith, Ralph Gibbs, | North Amherst. |
| Supple, Mark Wellman, | South Deerfield. |
| Thompson, Paul Ellis, | Brookline. |
| Torrey, Lewis Edwin, | Southbridge. |
| Urann, Carl B., | *Sullivan, Me.* |
| Valentine, Francis Wadsworth, | Boston. |
| Valentine, Richard Kirk, | *Erie, Pa.* |
| Vetter, Rudolf, | North Andover. |
| Walker, Elbert Lionel, | Savoy Center. |
| Walker, Rena Lillis, | Savoy Center. |
| Warfield, Preston George, | Buckland. |
| Wheeler, George Oscar, | Hudson. |
| Young, Earl Leonard, | South Hadley. |

Total, 64.

### SUMMARY BY CLASSES AND COURSES.

| | | |
|---|---|---|
| Graduate students, | | 18 |
| Senior class, | 45 | |
| Junior class, | 50 | |
| Sophomore class, | 91 | |
| Freshman class, | 134 | |
| Unclassified, | 12 | |
| | | 332 |
| | | 350 |
| Short courses: — | | |
| Summer school, 1909, | 176 | |
| Winter courses, 1910, | 64 | |
| | | 240 |
| | | 590 |
| Counted twice, | | 2 |
| Total, | | 588 |

### GEOGRAPHICAL SUMMARY.

| | |
|---|---|
| Massachusetts, | 499 |
| Connecticut, | 21 |
| New York, | 21 |
| New Jersey, | 11 |

| | |
|---|---|
| Rhode Island, | 7 |
| Maine, | 7 |
| New Hampshire, | 5 |
| Vermont, | 3 |
| Delaware, | 2 |
| Pennsylvania, | 2 |
| Indiana, | 1 |
| Illinois, | 1 |
| Missouri, | 1 |
| North Carolina, | 1 |
| Ohio, | 1 |
| Virginia, | 1 |
| Washington, | 1 |
| China, | 2 |
| Japan, | 1 |
| Total, | 588 |

# ALUMNI ASSOCIATIONS AND CLASS SECRETARIES.

## ALUMNI ASSOCIATIONS.

The Associate Alumni of the Massachusetts Agricultural College.
*President,* H. J. WHEELER, '83, Kingston, R. I.
*Secretary,* S. B. HASKELL, '04, Amherst, Mass.

The Local Alumni Association of the Massachusetts Agricultural College.
*President,* DAVID BARRY, '90, Amherst, Mass.
*Secretary,* SIDNEY B. HASKELL, '04, Amherst, Mass.

The Alumni Club of Massachusetts.
*President,* F. W. DAVIS, '89, Roslindale, Mass.
*Secretary,* H. W. DANA, '99, Salem, Mass.

The Connecticut Valley Association of the Massachusetts Agricultural College Alumni.
*President,* G. A. PARKER, '76, Hartford, Conn.
*Secretary,* WALTER B. HATCH, '05, Hartford, Conn.

The Massachusetts Agricultural College Club of New York.
*President,* A. W. LUBLIN, '84.
*Secretary,* DR. JOHN A. CUTTER, '82, 325 West Eighty-third Street, New York, N. Y.

The Massachusetts Agricultural Club of Washington, D. C.
*President,* A. F. BURGESS, '95, 1358 Newton Street, Washington, D. C.
*Secretary,* F. D. COUDEN, '04, 1310 Columbia Road, Washington, D. C.

The Western Alumni Association of the Massachusetts Agricultural College.
*President,* A. B. SMITH, '95, 544 Winnemac Avenue, Chicago, Ill.
*Secretary,* M. H. WEST, '03, 28 Lindon Court, Chicago, Ill.

*Class Secretaries.*

| Class of | Secretary. | Secretary's address. |
|---|---|---|
| 1871 | E. E. Thompson, | Worcester, Mass. |
| 1872 | S. T. Maynard, | Northborough, Mass. |
| 1873 | C. Wellington, | Amherst, Mass. |
| 1874 | – | – |
| 1875 | M. Bunker, | Newton, Mass. |
| 1876 | C. Fred Deuel, | Amherst, Mass. |
| 1877 | – | – |
| 1878 | C. O. Lovell, | 48 Summer Street, Boston, Mass. |
| 1879 | R. S. Swan, | Worcester, Mass. |
| 1880 | – | – |
| 1881 | J. L. Hills, | Burlington, Vt. |
| 1882 | G. D. Howe, | Bangor, Me. |
| 1883 | J. B. Lindsey, | Amherst, Mass. |
| 1884 | L. Smith, | 25 Mercantile Street, Worcester, Mass. |
| 1885 | E. W. Allen, | Washington, D. C. |
| 1886 | Dr. Winfield Ayres, | 616 Madison Avenue, New York, N. Y. |
| 1887 | F. H. Fowler, | Shirley, Mass. |
| 1888 | H. C. Bliss, | Attleborough, Mass. |
| 1889 | C. S. Crocker, | 25 South Van Pelt Street, Philadelphia, Pa. |
| 1890 | F. W. Mossman, | Westminster, Mass. |
| 1891 | H. T. Shores, | Northampton, Mass. |
| 1892 | H. M. Thomson, | Amherst, Mass. |
| 1893 | F. A. Smith, | Ipswich, Mass. |
| 1894 | S. F. Howard, | Amherst, Mass. |
| 1895 | H. A. Ballou, | Barbadoes, W. I. |
| 1896 | – | – |
| 1897 | C. A. Peters, | Moscow, Idaho. |
| 1898 | – | – |
| 1899 | D. A. Beaman, | Ponce, Porto Rico. |
| 1900 | E. K. Atkins, | Northampton, Mass. |
| 1901 | J. H. Chickering, | Dover, Mass. |
| 1902 | H. L. Knight, | 1731 T Street, Washington, D. C. |
| 1903 | G. D. Jones, | North Amherst, Mass. |
| 1904 | P. F. Staples, | North Grafton, Mass. |
| 1905 | P. F. Williams, | Auburn, Ala. |
| 1906 | Richard Wellington, | Geneva, N. Y. |
| 1907 | J. N. Summers, | Amherst, Mass. |
| 1908 | Jas. A. Hyslop, | 205 D Street, Washington, D. C. |

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Public Document No. 31

# FORTY-EIGHTH ANNUAL REPORT

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE.

## PART I.

REPORT OF THE PRESIDENT AND OTHER OFFICERS
FOR FISCAL YEAR ENDING NOV. 30, 1910.

JANUARY, 1911.

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# The Commonwealth of Massachusetts.

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Massachusetts Agricultural College,
Amherst, Dec. 1, 1910.

To His Excellency Eben S. Draper.

Sir: — I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part I. of the forty-eighth annual report of the trustees of the Massachusetts Agricultural College, for the fiscal year ended Nov. 30, 1910, this being the report of the president and other officers of the corporation of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
*President.*

# REPORT OF THE PRESIDENT OF THE COLLEGE.

*Gentlemen of the Corporation.*

I herewith submit my fifth annual report as president of the college.

## Attendance.

The attendance of students of college rank for the last college year exceeded that of the previous year by 68, and aggregated 320 four-years men, 12 unclassified students of college grade and 18 graduate students; there were 260 in various short courses, making a total attendance of 610. The entering class the present autumn numbered 158, the largest previous freshman class being 131, a year ago. The total number of four-years men in present attendance is 402; of unclassified students, 17; of graduate students, 15. (See Table I.)

Eighty-five per cent. of the present freshman class come from Massachusetts, with 9 other States and 1 foreign country, China, represented.

About one-fifth of the class are undecided as to their intended vocation; about one-third of the whole class state that they intend to follow some phase of professional agriculture or horticulture; and considerably more than one-third of the whole class state that they intend to follow some phase of practical agriculture or horticulture. Ninety-one per cent. of those having made a decision intend to follow an agricultural vocation. Less than one-fourth of the fathers of the members of the freshman class are engaged in agriculture or horticulture, and a trifle over one-fourth of the members of the freshman class were brought up on farms, although more than one-half of those not brought up on a farm have had some farm experience. The average age of the entering class is approximately nineteen years. (See Table IV., J.)

## Appropriations.

The total amount of special appropriations asked of the last Legislature was $277,500; the total amount granted was $115,625. An increase in the current annual appropriation was asked, amounting to $110,000; the amount granted was $37,500. (See Table II.)

The legislative appropriation of $15,000 has enabled us to equip in a complete manner the new building for entomology and zoölogy. Some delay was experienced in the completion of the building and the installation of the equipment; but the building is now fully used, and was dedicated with appropriate ceremonies November 11. The legislative appropriation of $17,500 for the purchase of land has enabled the college to acquire the larger proportion of the land on which options were held.

The legislative appropriations for land made during the past three years aggregate $23,500. This money has been expended in acquiring the following parcels: —

*Appropriations for Land.*

| | |
|---|---|
| 1908, | $500 00 |
| 1909, | 5,500 00 |
| 1910, | 17,500 00 |
| | $23,500 00 |

*Expenditures for Land.*

| | |
|---|---|
| Louisa Baker property, | $5,636 91 |
| Old creamery property, | 1,726 25 |
| Westcott property, | 2,250 00 |
| Harlow property, | 3,284 00 |
| Kellogg property, | 5,868 45 |
| E. Baker property, | 2,500 00 |
| George Allen property, | 500 00 |
| Charmbury property, | 450 00 |
| Loomis property, | 415 00 |
| Hawley and Brown property, | 675 00 |
| | $23,305 61 |
| Attorney's fees, | 128 41 |
| Balance, | 65 98 |
| | $23,500 00 |

Appropriations for two new buildings were granted by the Legislature: $12,000 for a laboratory for pomology and market gardening, and $10,000 for a building for animal husbandry.

The former building, while essentially an instruction building, will afford admirable facilities for both experiment and teaching in the subject of cold storage of fruits and vegetables, for packing and for other forms of laboratory work in pomology.

The animal husbandry building fills a serious gap in the college equipment, enabling the courses in stock judging to be put on a thoroughly modern basis, affording also ample room for the large classes entering during the short winter courses, serving as an auditorium for gatherings of farmers to witness demonstrations of various sorts, and, in general, as an arena for demonstration instruction. A brief description of both these buildings follows.

*Building for Pomology and Market Gardening.* — The new laboratory and storage building for pomology and market gardening is 74 by 42 feet, and consists of basement, one story and attic. In the basement are three large storage rooms, — one for vegetables and two for fruits, — where the bulk of the larger fruits and vegetables will be stored. On the ground floor is a large laboratory room for pomology, 18 by 56 feet, where such practicums as packing, testing spray apparatus, and other operations which require plenty of room, will be carried on. Adjoining this are three fruit rooms, — a large frost-proof room and two refrigerated rooms, one large and one small, each with its separate cooling apparatus, so that the rooms may be kept at different temperatures. In the attic are large storage rooms for fruit packages, ladders, spray pumps and the like. An elevator connects the various floors.

The vegetable gardening rooms on the main floor consist of a workroom; squash room, for storage; and four refrigerated compartments, each with its separate cooling system, to allow each being kept at a separate temperature. These rooms are designed especially for experimental work, and will be used also for the work of advanced students in vegetable gardening.

*The Animal Husbandry Building.* — This building, now nearing completion, is located directly south of the horse barn. It is 80 feet long and 50 feet wide, outside measurements, the longest dimension running north and south. The arena, which occupies the center of the building, is 27 by 78 feet, with tanbark floor and large doors at each end. On the west side of this there are five rows of seats, each row being fifteen inches above the one in front of it, so that every seat gives an unobstructed view of the arena. These seats will accommodate 180 persons without crowding. Under these there is a detention stable for stock brought from other farms; this will obviate the need of putting such stock in the college stables, and will also serve as a quarantine if needed. On the east side of the arena is a cement walk 6 feet wide, with a visitors' gallery above that will easily seat 63 people. In case of necessity chairs could be placed in one-half of the arena, giving seating capacity for 500 persons. A rolling partition across the center of the building makes it possible to use it either as one large or two smaller class rooms for judging, lectures or recitations.

The building is of brick, with slate roof, heated by steam and lighted by electricity. The cost of maintenance should be low.

## Commencement.

Commencement occurred June 22, and the college conferred the degree of Bachelor of Science on 43 men, and the degree of Master of Science on 1. The commencement address was given by Mr. Lucius Tuttle, then president of the Boston & Maine Railroad Company. President Tuttle's address was a strong discussion of the vocational trend of modern education. It was followed by remarks by Governor Eben S. Draper. The attendance at the alumni dinner was 178.

## Summer School.

The summer school registration for 1910 was 229. A few new courses were added, but in general the plans for our previous summer schools were duplicated.

In connection with the summer school there was held a gathering that we believe to be unique in the history of agricultural progress. Under the auspices of the summer school there was held a "Conference of Rural Social Workers" for the four days August 9 to 12 inclusive. The forenoon meetings consisted of sections, or departments, the program for each of which had been prepared by some organization representing a special interest, and included meetings for country clergymen, teachers of agriculture, rural teachers, local officers and paid workers in the rural department of the Young Men's Christian Association, lecturers of subordinate granges, officers of village improvement societies, and rural librarians. Each afternoon all delegates were brought together for a common program on some important phase of country life. Each evening there were formal addresses. The total registration of different individuals for the four days was 335, inclusive of perhaps 40 grange lecturers, who were present only for one day.

The fundamental idea of the conference was that of bringing together for consultation about concrete methods the local leaders in the rural communities of Massachusetts. The attendance, interest and even enthusiasm of those present fully justified the meeting.

## The Winter School.

The attendance at the winter courses was 64, this being about the same number as enrolled in 1909. A special addition was made by the giving of a two-weeks poultry course. The school itself was concluded by a farmers' week, which furnished a most admirable program, and brought together at least 559 different people.

## Extension Work.

The extension work, begun so auspiciously a year ago under the leadership of Professor William D. Hurd, has more than met expectations. In fact, so pressing have been the calls for lectures, for demonstration orchards, for correspondence courses and for other phases of work, that our faculty has been wholly unable to cope with this demand. One of the most progressive features of the last season's work was the running of a better-farming trolley train in co-operation with the State Board of Agriculture, the State forest service and the Springfield Board of Trade. The New England Securities Company, managers of some 600 miles of inter-urban trolley lines in Massachusetts, furnished the train, and made most admirable plans for the carrying out of the project. I speak of this enterprise particularly because, so far as we know, it is the first time that the inter-urban trolley has been used for agricultural educational purposes. I cannot, however, neglect to call attention to the great success of the better-farming train, run under the most efficient management of the Boston & Albany Railroad, in which we co-operated with the State Board of Agriculture, the State grange and the State forest service.

I present here a few facts concerning the details of the work of the extension service during the past year: —

*Statistics of the Extension Department.*

| | |
|---|---|
| Enrolment in conference of rural social workers, | 335 |
| Grange lecturers in above, | 40 |
| Enrolment in farmers' week, | 559 |
| Lectures given by faculty, | 159 |
| Lectures refused, | 197 |
| Total number in correspondence courses, | 252 |
| Demonstration orchards, | 6 |
| Better-farming trains: — | |
| Boston & Albany, | 4 days |
| Trolley, | 3 days |
| Attendance at lectures given from above, | 9,000 |
| Exhibits at fairs (5 or 6 lectures and demonstrations given each day at each fair), | 5 |

*Other Work of the Extension Department.*

| | |
|---|---|
| Ten-weeks course, enrolment, | 64 |
| Poultry course, enrolment, | 51 |
| Beekeepers' course, enrolment, | 20 |
| Summer school, enrolment, | 229 |

Conference on rural progress at West Newbury.
Advisory work with Faunce Demonstration Farm at Sandwich.
Co-operative work with Smith School of Agriculture at Northampton.
Numerous visits to farms to give advice.
Hundreds of letters answered.
Co-operation with tent camp meetings.

## CHANGES IN FACULTY AND OTHER OFFICERS.

Last June, Professor Charles H. Fernald resigned as director of the graduate school, professor of zoölogy and entomologist of the experiment station. He was granted a pension from the Carnegie Foundation, and was retained by the college as honorary director of the graduate school.

Professor Fernald had served the college for twenty-four years, and not only had he built up a strong department of zoölogy, but he created the department of entomology, and built it into one of the strongest departments of its kind in the United States. It was under his leadership that the graduate work of the college had its special development, and a large number of his former pupils are occupying most important teaching positions in the field of economic entomology. The new building for entomology and zoölogy is a splendid monument to his labors, and indicates objectively something of the professional skill, teaching ability and conspicuous success of this long period of service which Professor Fernald has rendered to the Massachusetts Agricultural College.

I regret to record that soon after the beginning of this last fiscal year Dean George F. Mills was taken suddenly and seriously ill. For many weeks his condition was alarming, and it was only after a prolonged convalescence that in the late summer he was enabled to leave the house. At the opening of the college year it was quite out of the question for him to resume his duties as dean, and he was therefore granted a leave of absence for the present college year. Students and faculty alike hope that his full strength may come to him again, and that he may be long with us in the most important and delicate position which he occupies as dean.

In January, 1910, Professor Fred W. Morse accepted a temporary appointment at the experiment station as assistant research chemist; in June the trustees made this position permanent for Professor Morse. Professor Morse received his training at Worcester Polytechnic Institute, graduating from that institution in 1887, and receiving his degree of M.Sc. in 1900. From 1888 to 1909 he was employed by the New Hampshire College of Agriculture and Experiment Station; from 1896 he was vice-director of the experiment station, and from 1889 he was professor of chemistry in the college there.

During the year the trustees created the department of zoology and geology, and placed Assistant Professor Gordon in charge; previously these two subjects have been separated.

Professor Waugh was granted a leave of absence for six months, beginning February 1; he spent the period in Europe, and at the opening of the present college year was back to take up his work here. During the entire college year Professor F. C. Sears served with signal ability and marked success in Professor Waugh's stead as acting head of the division of horticulture.

Mr. John R. Parker, graduate assistant in entomology and pomology, resigned to accept a position at the Montana College of Agriculture.

The course in rural law has been discontinued, and with it the services of Judge Robert W. Lyman of Northampton.

In February, 1910, Mr. Harold F. Tompson resigned as instructor in market gardening, and Mr. Charles S. Heller, a graduate of the Michigan Agricultural College, was elected to fill the vacancy.

Mr. Harry M. Jennison resigned his position as assistant in botany to take up work of like character in Wabash College.

Mr. Burke Hough resigned as purchasing agent, and Mr. William Chesley was appointed steward of the dining hall in his place.

During the summer Mr. Carl D. Kennedy resigned as assistant in the experiment station, and Mr. Clement L. Perkins, a graduate of the New Hampshire Agricultural College of the class of 1910, was appointed to fill the vacancy.

In June Mr. Roy F. Gaskill resigned as assistant in animal nutrition for the experiment station, and Mr. James R. Alcock is now filling that position.

Mr. Arthur I. Bourne, a graduate of Dartmouth College and formerly a graduate student at this institution, was made assistant entomologist for the experiment station in place of Mr. John N. Summers, resigned.

During the summer Miss Ola H. Perrin resigned as clerk to the director of short courses, and Miss Mabel R. Case, a graduate of Boston University, was appointed to that position.

The following minor changes in titles, etc., are also to be noted: —

In January, 1910, Dr. Joseph B. Lindsey was made vice-director of the experiment station; the title of Professor William D. Hurd was changed to that of director of extension work; Professor James A. Foord was made permanent head of the division of agriculture; Dr. James B. Paige has been acting dean since Jan. 1, 1910, in the absence of Professor Mills; Mr. Anderson A. Mackimmie was elected assistant to the dean; Professor Henry T. Fernald, on the resignation of Professor Charles H. Fernald, was chosen entomologist for the experiment station and acting director of the graduate school; Professor Philip B. Hasbrouck resumed his duties in September, after a year's leave of absence; Assistant Professor William P. B. Lockwood was made associate professor of dairying; Assistant Professor Robert W. Neal was made associate professor of English; Mr. Sidney B. Haskell was made assistant professor of agronomy; Mr. Floyd B. Jenks was made assistant professor of agricultural education; Dr. Alexander E. Cance was made assistant professor of agricultural economics; Mr. Frederick B. McKay was made assistant professor of public speaking and English; the title of Mr. John Summers was changed to that of graduate assistant.

## Officers for New Positions.

In 1909 the department of forestry was created; not until August, 1910, was there secured a suitable man to take charge of this work. Frank F. Moon, A.B., M.Fr., was elected as associate professor of forestry, and began his duties September 1. Professor Moon graduated from Amherst College in 1901, and from Yale Forest School in 1909; he has had experience in the United States Forest Service, and with the Fish and Game Commission of New York State.

Dr. Burton N. Gates was chosen assistant professor of beekeeping. Dr. Gates graduated from Clark College in 1905 with the degree of A.B., and in 1906 received the degree of A.M. from the same institution; he attended Cornell University and took his Ph.D. degree there in 1909. He has been serving in the United States Bureau of Entomology since 1906 as expert in apiculture, and later as assistant in apiculture. Dr. Gate's employment began July 1; he will serve as expert in beekeeping for the experiment station and as inspector of apiaries for the State Board of Agriculture, as well as assistant professor of beekeeping in the college.

Mr. Alvah J. Norman was elected as instructor in pomology, his services beginning Sept. 14, 1910. Mr. Norman graduated from the Iowa State College in 1906, and received the degree of M.Sc. from the Maryland Agricultural College in 1910; he will devote most of his time to work in the extension and short course department.

Mr. Charles J. Robinson has recently been made instructor in dairying and animal husbandry. Mr. Robinson is a graduate of the University of Illinois of the class of 1909, and has had wide experience in practical dairy work. He will assist in the extension and short course work of the college as well as in the regular courses.

Mr. Sumner C. Brooks fills the position as assistant botanist for the experiment station created by the trustees in January, 1910. Mr. Brooks is a graduate of the Massachusetts Agricultural College of the class of 1910.

Mr. W. A. Turner is serving as assistant in chemistry. Mr. Turner graduated from the Sheffield Scientific School in 1910, with the degree of Ph.B.

The trustees authorized an assistant in the department of English, and elected Miss Helena Goessmann of Amherst to the position; Miss Goessmann's active services are to begin Jan. 1, 1911.

Mr. E. M. J. Evans is serving temporarily as laboratory assistant in bacteriology.

Miss Dorothy Mudge of Boston was appointed to the position of clerk in the office of the treasurer, created by the trustees in June, 1910.

## Death of Dr. Goessmann.

On September 1, Dr. Charles A. Goessmann passed away. His connection with the college began in January, 1869, and continued uninterruptedly until 1907, when he was relieved of his active duties and made honorary director of the experiment station, and in June, 1908, honorary professor of chemistry.

I cannot here record the services nor eulogize the work of Dr. Goessmann. Appropriate memorial exercises were held in the college chapel October 12, and some steps will be taken to preserve in permanent form a record of his work. But I cannot refrain from calling your attention to the fact that it is the work and the character of men like Dr. Goessmann that, after all, make an educational institution great and strong. We need land, we need buildings, we need teaching equipment and apparatus; but we must have superior men. A strong, virile man with inferior equipment is worth any number of inferior men with the most modern equipment. One lesson of Dr. Goessmann's life as it affects the management of our college is that of careful selection of strong investigators and teachers, and reasonable and justifiable rewards for their work.

## Legislative Budget.

The legislative budget, as voted by the board of trustees at its meeting in Boston, November 4, may be summarized as follows: —

*Requested Increases in Current Funds, Available for Fiscal Year, Dec. 1, 1911, to Nov. 30, 1912.*

| Items. | Increase. | Total. |
|---|---|---|
| Administration, | $4,250 | $25,000 |
| Maintenance and equipment, | 43,250 | 88,000 |
| Investigations, | 5,000 | 15,500 |
| Instruction, | 22,500 | 70,500 |
| Short courses and extension teaching, | 15,000 | 30,000 |
| Inspection service, | – | 3,000 |
| | $90,000 | $232,000 |

*Requests for Appropriations for Special Purposes, 1911.*

| | |
|---|---|
| Improvements, west experiment station building, | $7,500 |
| Enlargement of Draper Hall, | 25,000 |
| Dormitory, | 20,000 |
| Dairy building and equipment, | 75,000 |
| Department equipment, | 15,000 |
| Repairs, | 20,000 |
| General improvements, | 25,000 |
| | $187,500 |

A brief statement or explanation of the need of these various amounts may well be made a part of this report.

*Reclassification of Current Funds.* — The trustees voted to ask the Legislature for an increase in current annual income, totaling $90,000 a year, divided into six different heads, representing the main types of work followed by the institution, namely: administration, maintenance and equipment, investigation, instruction, short courses and extension teaching, inspection service.

An explanation of the increases asked for will be clearer if I retain the old classification at this point. The following are the items: —

*Instruction.* — Increase, $15,000. This amount would bring the total for instruction purposes to $70,500, $5,000 more than was asked of the Legislature last year. This increase is necessary in part because of the increase in attendance of students. During the past four years many of the subjects required of all students, such as chemistry, mathematics and English, have doubled in attendance. The instruction force in these subjects, however, has very slightly increased. The consequence is that the teaching sections are inordinately large, — so large, in fact, that it is out of the question to get the best results of the teaching. These fundamental subjects, given to the students in the early years of their college course, should be given under the very best auspices, and one of the prime requisites is an ample teaching force, so that small sections may be the rule and so that no teacher shall be overworked. The close personal attention of first-class instructors in these subjects and at this time of the college course is vital to strong work on the part of the students. At least seven additional instructors are needed at once for work in chemistry, entomology, English, French and German, physics and mathematics.

The scope of our agricultural colleges is constantly broadening. Not many years have passed since a professor of agriculture and one or two assistants sufficed for instruction in agriculture; now there are numerous departments under the general name of agriculture, and we rarely find a professor of agriculture. In our own college during the past few years the professorship of horticulture has been broken up into professorships of landscape gardening, pomology, floriculture, market gardening and forestry. While we wish to avoid undue multiplication of departments, we must recognize new fields of work. At present the college gives no attention whatever to some very important branches of agricultural instruction. A State college of agriculture also has an obligation to turn out good citizens and well-rounded men. It is important, therefore, that we have well-developed departments of economics, political science, etc. We ought to be able to establish next autumn departments of farm mechanics, bacteriology, poultry husbandry, economics and sociology, in addition to the instructorships already named. These important departures I realize cannot all be made even with an increase of $15,000 a year additional for instruction; but they demonstrate the need of at least that much increase as a minimum.

*Maintenance.* — Increase, $15,000. This increase would bring the item of maintenance and equipment to a total of $88,000. While the treasurer's report shows a comfortable financial balance for the fiscal year, this balance was purchased at the sacrifice of several new departments which in justice to the students should have been established this last autumn. Not only have we new instructors and departments to provide for, but the large entomological building must be heated and lighted and cared for; the new buildings for animal husbandry and pomology will require similar support, and the increase in the number of students necessarily calls for some increased cost of maintenance. In order to provide for this natural growth it is necessary that the maintenance item shall be considered an essential appropriation.

*Graduate School.* — Increase, $2,500. This increase was recommended last year. The graduate school is very important, but cannot be developed without more funds, and the amount asked for is exceedingly small for the purpose.

*Normal Department.* — Increase, $5,000 a year. This department needs clerical help and additional instruction. The department had over 7,000 boys and girls in corn and potato clubs this past season, and this valuable work can be greatly — almost indefinitely — increased with the proper office help and supervision. The amount is the same as that asked last year.

*Short Course and Extension Work.* — Increase, $15,000. The short course and extension work has grown very rapidly during the past year. Not less than 9,000 people were reached by the better-farming trains. Over 250 people are taking correspondence work in agriculture. Scores of lectures are given by our college teachers, and many more declined for lack of men to send. Demonstration orchards have been started in various parts of the State, and many others are demanded. It is exceedingly important that we should be able to push a strong educational campaign in Massachusetts on behalf of dairy farms. We also want to take advantage of the new interest in corn growing. In some respects this extension work is the most important work of the college, because it reaches the great body of farmers directly with practical instruction and help regarding modern methods of agriculture and horticulture.

*Student Labor.* — Increase, $2,500 a year. This is needed because of the large increase in the number of students.

*Agricultural Survey.* — $5,000 a year. The United States Department of Agriculture proposes to make a soil survey of the State, but insists upon our co-operation. In order to carry on in adequate fashion a comprehensive campaign of agricultural education in Massachusetts, it is necessary that we shall make an inventory of the agricultural resources of the State. We need a soil survey. We need to map the orchard lands and corn areas, to study farm management, to investigate the conditions that govern the sale of the farmers' products, and even to study the community life and institutions. In this way alone can we know thoroughly the real problems of Massachusetts agriculture and country life, and be prepared to give the very best advice. Some phases of this work are being done in many other States, and we should not lag behind. The willingness of the United States Department of Agriculture to co-operate places an obligation upon the State of Massachusetts.

*Grounds.* — $5,000. This amount is needed annually for the development of roads, walks, drives, plantings and the general care of the same. The amount at present expended is in the neighborhood of $2,000 a year, and is simply an up-keep, and, indeed, is not sufficient for that, and does not permit of any improvements whatever.

*Repairs.* — $15,000 a year. I recommended in my last report that we should ask the Legislature for not less than $15,000 a year for the purpose of the contingent repairs. This amount is about 3 per cent. of our inventoried valuation of buildings, and is by no means excessive. At present we are obliged to ask each Legislature for a special appropriation for this purpose. We could manage the matter in a much more business-like fashion, and relieve the Legislature of the necessity of going over small details, if we had this amount coming to us annually.

*Equipment.* — $10,000 a year. The same arguments advanced for the permanent repair item apply to the permanent item of teaching equipment and apparatus for the various departments of the institution. It is expected that whenever a new building is erected a special appropriation shall be asked for to equip that building thoroughly. This item is intended to maintain the inventory of existing departments with respect to teaching equipment, apparatus, farm tools, live stock, etc., and is designed to take the place of the special legislative item for these purposes which goes to the Legislature each year.

*Administration.* — This item in the new classification represents the salaries and office expenses of the officers of the institution whose duties are largely or wholly administrative. It is also intended to include a small amount, perhaps $5,000, which shall serve for emergencies of various types. The new classification will make it possible to present a more complete picture of the work of the institution and the expenditures of money, and I trust may be adopted by the Legislature.

### *Requests for Appropriations for Special Purposes.*

*Improvements, West Experiment Station Building.* — $7,500. This building has been quite outgrown by the development of experimental work in chemistry and by increase of inspection service devoted to fertilizers and feed stuffs. The experimental work particularly is seriously handicapped by this lack of room. Last year the Legislature was asked to appropriate $28,000 for the enlargement of this building. It was thought at the time that the best plan would be to enlarge the building sufficiently to serve both the instruction work and the research work in chemistry. The appropriation was refused by the last Legislature, and the plans during the past summer were redrawn. Estimates obtained on the revised plans indicated that the amount of $28,000 would not be enough to make the changes, and the trustees decided that under these circumstances the best policy was to spend a comparatively small amount of money in some minor changes in the present building, and then plan for an entirely new building, to be asked for in the early future, for the purpose of housing the experiment station work in chemistry. It is thought that $7,500 will make it possible to continue the inspection service in this building for many years to come, and will temporarily give relief to the research work in chemistry.

*Enlargement of Draper Hall.* — $25,000. This improvement was asked for last year. The present dining hall barely accommodates the present number of students, and next autumn will undoubtedly be entirely too small for the probable number in attendance. When the building was erected less than 75 students took their meals at the dining hall. At the opening of this fall term nearly 350 students were taking their meals there, although the number has decreased somewhat since then; but during the ten weeks' winter school there will be a demand from 75 or 100 more men for boarding facilities. It is easily seen, therefore, that this is an improvement that is well-nigh imperative.

*Dormitory.* — $20,000. At the present time the college is housing on the college campus about 75 out of its 400 students. It is difficult for students to find rooms in the village, and often the price that they are obliged to pay is beyond the ability of students who are working their way through college. A study has been made of the problem of securing a modern dormitory at a minimum cost. The plans as presented call for a well-built structure of pleasing architecture, with modern conveniences, the specifications showing that it can be built for an expenditure not exceeding $400 per occupant. On this basis the trustees believe that it will be possible, at a rental to the students not to exceed $1.25 per week, to heat the building, furnish janitor service, provide for future repairs, and still secure a return on the investment of at least 4 per cent.

*Dairy Building and Equipment.* — This appropriation was asked of the Legislature last year, the same amount and practically the same plan, $75,000. The dairy industry is the largest single agricultural industry in the State of Massachusetts. It deserves special recognition by the Commonwealth, and particularly on the educational side. This building will enable us to develop a thoroughly modern plant. The dairy work at the college is very popular, both with the regular and special students. The present facilities are wholly inadequate.

*Department Equipment.* — $15,000. This item comprises miscellaneous teaching apparatus and office equipment for the various departments.

*Repairs.* — $20,000. To be used for general repairs about the institution, — repairs of buildings, offices, heating and lighting plant, water system, sewer system, etc.

*General Improvements.* — $25,000. This covers miscellaneous items as presented by the treasurer of the college and other various departments, such as small buildings for beekeeping, sheep sheds, storage building for plumbing and carpenter equipment, intercommunicating telephone system, improvements in the electric light plant, new sewers, etc.

Respectfully submitted,

KENYON L. BUTTERFIELD,
*President.*

AMHERST, NOV. 30, 1910.

# STATISTICS OF THE COLLEGE.

### TABLE I. — *Attendance.*

| | For Year ending June 30, 1910. | For Year ending Nov. 30, 1910. |
|---|---|---|
| Graduate students, | 18 | 15 |
| Senior class, | 45 | 47 |
| Junior class, | 50 | 87 |
| Sophomore class, | 91 | 110 |
| Freshman class, | 134 | 158 |
| Unclassified students, | 12 | 17 |
| | —— 350 | —— 434 |
| Short courses: — | | |
| Winter course, 1910, | 64 | 64 |
| Summer school, | 176[1] | 229[2] |
| Bee course, 1910, | 20 | 20 |
| | —— 260 | —— 313 |
| Total, | 610 | 747 |

[1] Summer of 1909.

[2] Summer of 1910.

### TABLE II. — *Legislative Budget, 1910.*

| ITEMS. | Amount asked. | Amount granted. |
|---|---|---|
| 1. Special appropriations: — | | |
| Maintenance expense, | $18,000 00 | $18,000 00 |
| Instruction, | 5,000 00 | 2,500 00 |
| Normal department, | 1,250 00 | – |
| Short courses, | 4,375 00 | 625 00 |
| Graduate school, | 625 00 | – |
| Grounds, | 1,250 00 | – |
| Equipment, entomological laboratory, | 15,000 00 | 15,000 00 |
| Repairs and improvements, | 35,000 00 | 25,000 00 |
| Teaching and office equipment, | 15,000 00 | 10,000 00 |
| Dairy building, | 75,000 00 | – |
| Enlargement of west experiment station building, | 28,000 00 | – |
| Building for animal husbandry, | 10,000 00 | 10,000 00 |
| Laboratory for pomology and market gardening, | 16,000 00 | 12,000 00 |
| Buildings for poultry husbandry, | 5,000 00 | 5,000 00 |
| Enlargement of Draper Hall, | 23,000 00 | – |
| Land, | 25,000 00 | 17,500 00 |
| | $277,500 00 | $115,625 00 |
| 2. Increase in current annual appropriations: — | | |
| Instruction, | $20,000 00 | $10,000 00 |
| Maintenance, | 35,000 00 | 20,000 00 |
| Graduate school, | 2,500 00 | – |
| Normal department, | 5,000 00 | – |
| Short courses, | 17,500 00 | 7,500 00 |
| Repairs, | 15,000 00 | – |
| Equipment, | 10,000 00 | – |
| Grounds, | 5,000 00 | – |
| | $110,000 00 | $37,500 00 |

## TABLE III. — *Speakers for the Year.*

### *Speakers at Sunday Services for Year ending Nov. 30, 1910.*

1909.
Dec. 5. — Dr. Samuel A. Eliot, Boston.
Dec. 12. — Rev. A. P. Reccord, Springfield.

1910.
Jan. 9. — Bishop Alexander H. Vinton, Springfield.
Jan. 16. — Rev. Philip S. Moxom, Springfield.
Jan. 23. — Rev. Herbert J. White, Hartford, Conn.
Feb. 13. — Rev. Charles F. Carter, Lexington.
Feb. 20. — Rev. Charles S. Macfarland, South Norwalk, Conn.
Feb. 27. — Rev. Albert P. Fitch, Cambridge.
Mar. 6. — President Kenyon L. Butterfield.
Mar. 13. — Dr. F. E. Emrich, Boston.
Mar. 20. — Rev. James DeNormandie, Roxbury.
Sept. 18. — President Kenyon L. Butterfield.
Sept. 25. — Mr. John Y. Beattie, Springfield.
Oct. 2. — Mr. Robert L. O'Brien, Boston.
Oct. 9. — Dr. Warren H. Wilson, New York.
Oct. 16. — Mr. Albert E. Roberts, New York.
Oct. 23. — Mr. Charles H. White, Amherst.
Oct. 30. — Dr. R. DeWitt Mallary, Springfield.
Nov. 6. — Rev. F. E. Tower, Albany, N. Y.
Nov. 13. — Hon. Frank A. Hosmer, Amherst.
Nov. 20. — Hon. Henry Bond, Greenfield.

### *Speakers at Wednesday Assemblies for Year ending Nov. 30, 1910.*

1909.
Dec. 8. — Dean Eugene Davenport, Urbana, Ill.

1910.
Jan. 26. — Dr. W. I. Chamberlain, Hudson, O.
Feb. 9. — Dr. Benjamin A. Trueblood, Boston.
Feb. 16. — Prof. John S. Bassett, Northampton.
Feb. 23. — Mrs. Mabel Loomis Todd, Amherst.
Mar. 16. — Dr. Winfield Ayres, New York.
April 6. — Mr. M. V. Richards, Washington, D. C.
April 27. — Dr. David Snedden, Boston.
May 4. — Mr. Edward Porritt, Hartford, Conn.
May 18. — Mr. Henry Wallace, Des Moines, Ia.
May 25. — Mr. Frederick P. Fish, Boston.
Oct. 5. — Mr. C. T. Wang, New Haven, Conn.
Oct. 19. — Dr. John Graham Brooks, Cambridge.
Oct. 26. — Dr. Joel E. Goldthwait, Boston.
Nov. 9. — Prof. Frank A. Waugh, Amherst.
Nov. 30. — Capt. George C. Martin, Amherst.

Table IV. — *Statistics of Freshmen entering College in September, 1910.*

(*A*) *Home Addresses (classified by Towns and Cities).*

| | |
|---|---|
| Agawam, | 1 |
| Amherst, | 3 |
| Arlington, | 2 |
| Bangor, Me., | 1 |
| Belchertown, | 1 |
| Blackstone, | 1 |
| Boston, | 17 |
| Brimfield, | 1 |
| Brockton, | 4 |
| Brookline, | 1 |
| Brown Station, N. Y., | 1 |
| Cambridge, | 1 |
| Cataumet, | 1 |
| Concord, | 2 |
| Dedham, | 1 |
| Duxbury, | 1 |
| Easton, | 1 |
| Everett, | 1 |
| Fall River, | 2 |
| Gilbertville, | 1 |
| Glen Cove, L. I., | 1 |
| Granby, | 1 |
| Greenfield, | 1 |
| Groton, | 1 |
| Hadley, | 1 |
| Hanson, | 1 |
| Haverhill, | 1 |
| Hingham, | 1 |
| Holliston, | 1 |
| Holyoke, | 1 |
| Huntington, L. I., | 1 |
| Hyannis, | 1 |
| Hyde Park, | 1 |
| Irvington-on-Hudson, N.Y., | 1 |
| Kingston, R. I., | 1 |
| Lancaster, | 1 |
| Lawrence, | 2 |
| Lee, | 1 |
| Leominster, | 1 |
| Lincoln, | 1 |
| Littleton, | 2 |
| Lowell, | 3 |
| Lynn, | 1 |
| Malden, | 4 |
| Marshalltown, Ia., | 1 |
| Marshfield, | 1 |
| Mattapoisett, | 1 |
| Medford, | 1 |
| Medway, | 1 |
| Melrose, | 2 |
| Mendon, | 2 |
| Methuen, | 1 |
| Monson, | 1 |
| Morristown, Pa., | 1 |
| Mount Kisco, N. Y., | 1 |
| Mount Vernon, N. Y., | 1 |
| New Bedford, | 1 |
| New Braintree, | 1 |
| New Haven, Conn., | 1 |
| New London, Conn., | 1 |
| Newton, | 1 |
| New York, N. Y., | 3 |
| North Adams, | 2 |
| Northampton, | 3 |
| North Weymouth, | 1 |
| Oxford, | 1 |
| Palmer, | 1 |
| Peabody, | 2 |
| Philadelphia, Pa., | 1 |
| Plymouth, | 1 |
| Poquonock, Conn., | 1 |
| Portsmouth, N. H., | 1 |
| Quincy, | 1 |
| Raynham, | 1 |
| Rutherford, N. J., | 1 |
| Salem, | 3 |
| Sandwich, | 1 |
| Shanghai, China, | 1 |
| Sheffield, | 1 |
| Sherborn, | 1 |
| Somerville, | 1 |
| Southbridge, | 1 |
| Southbury, Conn., | 1 |
| South Framingham, | 3 |
| South Hadley Falls, | 2 |
| South Hanson, | 1 |
| Springfield, | 3 |
| Stafford Springs, Conn., | 1 |
| Sunderland, | 2 |
| Taunton, | 1 |
| Templeton, | 1 |
| Tolland, | 1 |
| Townsend, | 1 |
| Truro, | 1 |
| Wakefield, | 1 |
| Walpole, | 1 |
| Waltham, | 1 |
| Ware, | 1 |
| Wareham, | 1 |
| Watertown, | 1 |
| Wellesley, | 1 |
| West Burke, Vt., | 1 |
| West Somerville, | 2 |
| West Springfield, | 2 |
| Wethersfield, Conn., | 1 |
| Winthrop, | 2 |
| Worcester, | 2 |

(*B*) *Home Addresses (classified by Countries and States).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| China, | 1 | .63 | New Jersey, | 1 | .63 |
| Connecticut, | 6 | 3.80 | New York, | 9 | 5.70 |
| Iowa, | 1 | .63 | Pennsylvania, | 2 | 1.26 |
| Maine, | 1 | .63 | Rhode Island, | 1 | .63 |
| Massachusetts, | 134 | 84.81 | Vermont, | 1 | .63 |
| New Hampshire, | 1 | .63 | | | |
| | | | | 158 | 99.98 |

(*C*) *Home Addresses (classified by Counties of Massachusetts).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| Barnstable, | 5 | 3.72 | Hampshire, | 12 | 8.95 |
| Berkshire, | 3 | 2.24 | Middlesex, | 32 | 23.13 |
| Bristol, | 6 | 4.48 | Nantucket, | – | – |
| Dukes, | – | – | Norfolk, | 8 | 5.96 |
| Essex, | 10 | 7.43 | Plymouth, | 11 | 8.19 |
| Franklin, | 3 | 2.24 | Suffolk, | 19 | 14.15 |
| Hampden, | 13 | 9.67 | Worcester, | 12 | 8.95 |
| | | | | 134 | 99.11 |

### (*D*) *Nativity of Parents.*

| | Number. | Per Cent. |
|---|---|---|
| Neither parent foreign born, | 117 | 74.05 |
| Both parents foreign born, | 25 | 15.82 |
| Mother foreign born, | 14 | 8.86 |
| Father foreign born, | 2 | 1.26 |
| | 158 | 99.99 |

### (*E*) *Education of Father.*

| | Number. | Per Cent. |
|---|---|---|
| Common school, | 79 | 50 |
| High school, | 46 | 29.11 |
| Business school, | 8 | 5.06 |
| College, | 21 | 13.29 |
| Deceased and no statistics, | 4 | 2.53 |
| | 158 | 99.99 |

### (*F*) *Religious Census.*

| DENOMINATION. | MEMBERSHIP. | | PREFERENCE. | | TOTALS. | |
|---|---|---|---|---|---|---|
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. |
| Baptist, | 9 | 5.70 | 4 | 2.53 | 13 | 8.23 |
| Catholic, | 15 | 9.49 | – | – | 15 | 9.49 |
| Congregational, | 37 | 23.42 | 22 | 13.92 | 59 | 37.34 |
| Episcopal, | 13 | 8.23 | 4 | 2.53 | 17 | 10.76 |
| Methodist, | 9 | 5.70 | 5 | 3.16 | 14 | 8.86 |
| Miscellaneous, | 5 | 3.16 | 8 | 5.06 | 13 | 8.23 |
| Presbyterian, | 4 | 2.53 | – | – | 4 | 2.53 |
| Unitarian, | 6 | 3.80 | 8 | 5.06 | 14 | 8.86 |
| Universalist, | 3 | 1.90 | 6 | 3.80 | 9 | 5.70 |
| | 101 | 63.93 | 57 | 36.06 | 158 | 100.00 |

### (*G*) *Occupation of Fathers.*

| | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture, | 37 | 23.42 |
| Artisans, | 30 | 18.98 |
| Business, | 48 | 30.37 |
| Deceased, | 11 | 6.97 |
| Miscellaneous, | 18 | 11.40 |
| Professional, | 11 | 6.97 |
| Retired, | 3 | 1.90 |
| | 158 | 100.01 |

### (*H*) *Intended Vocations of Students.*

| | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture (practical), | 60 | 37.96 |
| Agriculture and horticulture (professional), | 52 | 32.91 |
| Engineering, | 9 | 5.70 |
| Professions, | 2 | 1.26 |
| Undecided, | 35 | 21.16 |
| | 158 | 99.99 |

### (*I*) *Farm Experience.*

| | Number. | Per Cent. |
|---|---|---|
| Brought up on a farm, | 43 | 27.22 |
| Not brought up on a farm, | 115 | 72.79 |
| Not brought up on a farm but having had some farm experience, | 59 | 37.34 |

### (*J*) *Miscellaneous Statistics.*

| | |
|---|---|
| Average age, | 19.07 years. |
| Number applying for student labor, | 92, 58.22 per cent. |
| Number boarding at Draper Hall, | 142, 89.87 per cent. |

## Table V. — *Loans and Gifts.*

*Massachusetts Experiment Station. — List of Gifts for the Year ending Nov. 1, 1910.*

| | |
|---|---|
| Park & Pollard Co., 46 Canal Street, Boston, | 2 lullaby brooders. |
| J. A. Jocoy, 701 Second Street, Towanda, Pa., | 1 Jocoy's poultry food hopper. |
| Bolgiano & Son, Baltimore, Md., | 1 packet seed "My Maryland" tomato. |
| German Kali Works, Baltimore, Md., | 1 ton muriate of potash.<br>1 ton high-grade sulfate of potash.<br>1 ton sulfate of potash-magnesia.<br>200 pounds kainit. |
| American Coal Products Co., 17 Battery Place, New York, | 300 pounds sulfate of ammonia. |
| Rogers & Hubbard, Middletown, Conn., | 100 pounds Hubbard's raw knuckle bone flour.<br>100 pounds Hubbard's dissolved bone black. |
| 20th Century Co., Boston, Mass., | 3 pounds superfine ground granitic rock. |

*Library. — List of Gifts for Two-Year Period, ending Nov. 30, 1910.*

| | |
|---|---|
| Allen, Dr. E. W., Washington, D. C., | Complete set of "Experiment Station Record." |
| Brooks, Dr. William P., Amherst, | Agricultural periodicals and magazines. |
| Carruth, Herbert S., Boston, | Fifteen volumes relating to flora and fauna of New Zealand. |
| Chapman, George H., Amherst, | Experiment station bulletins. |
| Clark, Mrs. Milford H., Sunderland, | Magazines and books. |
| Crane, Hon. W. Murray, Dalton, | History of the United States capitol, 2 volumes. |
| Fernald, Prof. Charles H., Amherst, | Scientific contributions and college publications. |
| Fowler, F. H., Boston, | Agricultural bulletins and reports. |
| Gage, Mrs. A. E., Woburn, | "American Review of Reviews," 16 volumes. |
| Henry, Mrs. George, Amherst, | Magazines and books. |
| Hosmer, Hon. Frank A., Amherst, | Public documents. |
| Howard, Prof. S. Francis, Amherst, | Magazines and newspaper clippings. |
| Lodge, Hon. Henry Cabot, Nahant, | Congressional documents. |
| Mills, Prof. George F., Amherst, | Magazines. |
| Mills, James K., Amherst, | Books, photographs and magazines. |
| Osmun, Prof. A. V., Amherst, | Agricultural bulletins and magazines. |
| Raymond, Prof. George L., Princeton, N. J., | Ten volumes on "Comparative Æsthetics." |
| Stone, Dr. George E., Amherst, | Magazines. |
| Superintendent of Documents, Washington, D. C., | American Historical Association reports, document catalogues, and United States public documents. |
| United States Department of Agriculture, Washington, D. C., | Complete set of Farmers' bulletins, and numerous other publications. |
| Walker, Dr. C. S., Amherst, | Newspaper clippings and pamphlets. |
| Waugh, Prof. F. A., Amherst, | Magazines and books. |
| Williams, Mrs. Mary E., Amherst, | Books. |

Special mention is gladly made concerning the large number of botanical and horticultural books recently given to the library by Mr. George C. Woolson, 1871, of Yonkers, N. Y. The larger part of the collection belonged originally to Mr. Woolson's brother-in-law, the late Dr. George Thurber, a botanist of wide reputation, and whom Dr. Sargent of Harvard described as the most accomplished horticultural writer in the country.

In presenting these books to the library Mr. Woolson gives them as a memorial to the class of 1871, and this idea is to be conveyed by the special bookplate which is to be made for this collection. A detailed description of this splendid gift of about 1,200 volumes cannot be made at this time, but it is intended to publish something of that nature in one of the college publications at an early date.

# REPORT OF TREASURER

## FOR THE FISCAL YEAR ENDING NOV. 30, 1910.

### BALANCE SHEET.

| | | | DR. | CR. |
|---|---|---|---|---|
| **1909.** | | | | |
| Dec. 1. | To cash on hand, | | $4,106 58 | |
| | To cash on deposit, | | 10,813 84 | |
| **1910.** | | | | |
| Nov. 30. | To special appropriation receipts, State Treasurer, | | 121,152 88 | |
| | By special appropriation disbursements, | | | $121,933 47 |
| | To experiment station receipts, | | 60,791 90 | |
| | From State Treasurer, | $13,500 00 | | |
| | From United States Treasurer | 29,000 00 | | |
| | From other sources, | 18,291 90 | | |
| | By experiment station disbursements, | | | 61,674 64 |
| | To current accounts receipts, | | 193,029 03 | |
| | From United States Treasurer, Morrill fund, | $16,666 67 | | |
| | From United States Treasurer, Nelson fund, | 13,333 33 | | |
| | From State Treasurer, endowed fund, | 10,613 32 | | |
| | From State Treasurer, maintenance, | 33,000 00 | | |
| | From State Treasurer, scholarship, | 15,000 00 | | |
| | From State Treasurer, instruction, | 40,000 00 | | |
| | From State Treasurer, Extension department, | 8,125 00 | | |
| | From State Treasurer, agricultural education, | 5,000 00 | | |
| | From State Treasurer, veterinary, | 1,000 00 | | |
| | From State Treasurer, student labor, | 7,500 00 | | |
| | From other sources, | 42,790 71 | | |
| | By current account disbursements, | | | 182,693 14 |
| | To student trust funds receipts, | | 57,571 79 | |
| | By student trust funds disbursements, | | | 55,777 37 |
| | To experiment station trust funds receipts, | | 728 87 | |
| | By experiment station trust funds disbursements, | | | 471 47 |
| | By cash on hand, | | | 5,664 38 |
| | By cash on deposit, | | | 19,980 42 |
| | | | $448,194 89 | $448,194 89 |

## STATEMENT OF THE FIRST NATIONAL BANK OF AMHERST WITH THE MASSACHUSETTS AGRICULTURAL COLLEGE.

| | | DR. | CR. |
|---|---|---|---|
| **1909.** | | | |
| Dec. 1. | Balance on hand, | $25,986 26[1] | |
| **1910.** | | | |
| Nov. 30. | Deposits, | 474,029 15 | |
| | Interest, | 264 29 | |
| | Disbursements as per warrants paid, | | $460,111 23 |
| | Balance on hand, | | 40,168 47[1] |
| | | $500,279 70 | $500,279 70 |

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[1] These amounts are greater Dec. 1, 1909, by $15,172.42, and Nov. 30, 1910, by $20,155.11, on account of outstanding checks.

## SPECIAL APPROPRIATIONS.

| NAME OF APPROPRIATION. | Date made. | Amount of Appropriation. | Amount previously expended. | Amount expended during Fiscal Year. | Amount expended to Date. | Amount received from State Treasurer. | Balance on Hand with State Treasurer. | |
|---|---|---|---|---|---|---|---|---|
| Athletic field, | 1909 | $5,500 00 | $4,761 10 | $738 90 | $5,500 00 | $5,500 00 | – | – |
| Replacing barn, | 1909 | 30,000 00 | 19,187 48 | 13,689 04 | 32,876 52 | 30,000 00 | – | $2,876 52[1] |
| Repairs and improvements, | 1909 | 33,000 00 | 24,620 84 | 8,633 93 | 33,254 77 | 33,254 77 | – | – |
| Teaching equipment, | 1909 | 10,000 00 | 4,267 28 | 5,738 72 | 10,337 40 | 10,337 40 | – | – |
| Zoölogical building, | 1909 | 80,000 00 | 16,390 31 | 50,380 72 | 66,771 03 | 66,771 03 | $13,246 32 | – |
| Animal husbandry building, | 1910 | 10,000 00 | – | 4,166 35 | 4,166 35 | 3,975 21 | 6,024 79 | – |
| Investigation as to cranberry growing, | 1910 | 15,000 00 | – | 63 06 | 63 06 | 63 06 | 14,936 94[2] | – |
| Laboratory for pomology, | 1910 | 12,000 00 | – | 1,223 38 | 1,223 38 | 1,223 38 | 10,776 62 | – |
| Land, | 1910 | 17,500 00 | – | 11,797 11 | 11,797 11 | 11,797 11 | 65 98[3] | – |
| Repairs and improvements, | 1910 | 25,000 00 | – | 16,640 06 | 16,640 06 | 15,118 95 | 9,881 05 | – |
| Teaching and office equipment, | 1910 | 10,000 00 | – | 2,984 13 | 2,984 13 | 2,494 51 | 7,505 49 | – |
| Equipment for laboratory, entomology and zoölogy, | 1910 | 15,000 00 | – | 5,872 19 | 5,872 19 | 5,066 67 | 9,933 33 | – |
| | | $263,000 00 | $69,227 01 | $121,927 59 | $191,486 00 | $185,602 09 | $72,370 52 | – |

[1] There is a credit of $3,200 under farm buildings to take care of this amount.

[2] From this amount should be taken $12,736.25 paid direct by State Treasurer.

[3] This amount was lessened by $5,636.91 being paid direct by State Treasurer.

## CURRENT ACCOUNTS.

### *Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1, 1909, to Nov. 30, 1910. | Receipts from Dec. 1, 1909, to Nov. 30, 1910. | Apportionment for Year ending Nov. 30, 1910. | Balance to Credit. |
|---|---|---|---|---|
| Architects' fees, | $3,155 44[1] | – | – | —$3,155 44 |
| Administration, | 4,729 04 | $30 07 | $5,010 00 | 310 96 |
| Agricultural, | 22,028 79 | 16,339 90 | 5,825 00 | 136 11 |
| Agricultural economics, | 112 60 | – | 50 00 | —62 60 |
| Agricultural education, | 5,047 21 | 15 91 | 5,000 00 | —31 30 |
| Botanical, | 994 05 | 259 34 | 700 00 | —34 71 |
| Chemical, | 2,137 73 | 2,075 14 | 1,000 00 | 937 41 |
| Dean's office, | 232 36 | 36 | 200 00 | —32 00 |
| Entomology, | 515 29 | 251 61 | 725 00 | 461 32 |
| English, | 539 69 | 1 00 | 855 00 | 316 31 |
| Extension department, | 12,336 03 | 1,745 63 | 8,125 00 | —2,465 40 |
| Floriculture, | 2,987 80 | 2,495 93 | 1,250 00 | 758 13 |
| General horticulture, | 2,436 18 | 805 51 | 1,800 00 | 169 33 |
| General maintenance, | 32,405 40 | 10,739 37 | 30,700 00 | 9,033 97 |
| Graduate school, | 1,413 19 | – | 2,500 00 | 1,086 81 |
| Grounds, | 1,444 30 | 54 10 | 1,200 00 | —190 20 |
| Library, | 5,083 89 | 567 51 | 4,575 00 | 58 62 |
| Landscape gardening, | 258 21 | 123 90 | 100 00 | —34 31 |
| Market gardening, | 4,970 60 | 2,604 94 | 2,100 00 | —265 66 |
| Mathematics and physics, | 251 74 | 1 12 | 400 00 | 149 38 |
| Military, | 1,657 52 | 53 25 | 1,500 00 | —104 27 |
| Options on land, | 125 00 | 115 00 | – | —10 00 |
| Physical education, | 566 41 | 137 85 | 530 00 | 101 44 |
| Political science, | 7 05 | – | 10 00 | 2 95 |
| Pomology, | 3,237 78 | 1,398 70 | 1,850 00 | 10 92 |
| President's office, | 721 91 | 15 25 | 800 00 | 93 34 |
| Registrar, | 249 12 | – | 300 00 | 50 88 |
| Salaries, | 71,124 91 | 143 32 | 70,950 00 | —31 59 |
| Treasurer's office, | 753 75 | 34 69 | 675 00 | —44 06 |
| Veterinary, | 777 42 | 5 90 | 1,542 97[2] | 771 45 |
| Zoölogical, | 392 73 | 275 41 | 20 00 | —97 32 |
| State Treasurer: — | | | | |
| Endowment fund, | – | 10,613 32 | – | – |
| Instruction fund, | – | 40,000 00 | – | – |
| Maintenance fund, | – | 33,000 00 | – | – |
| Student labor fund, | – | 7,500 00 | – | – |
| Scholarship fund, | – | 15,000 00 | – | – |
| Extension department, | – | 8,125 00 | – | – |
| Agricultural education, | – | 5,000 00 | – | – |
| Veterinary, | – | 1,000 00 | – | – |
| Graduate school, | – | 2,500 00 | – | – |
| United States Treasurer: — | | | | |
| Morrill fund, | – | 16,666 67 | – | – |
| Nelson fund, | – | 13,333 33 | – | – |
| | $182,693 14 | $193,029 03 | $150,292 97 | $14,449 33 |
| Balance beginning fiscal year, Dec. 1, 1909, | – | 11,719 89 | – | —6,558 86 |
| Balance on hand Nov. 30, 1910, | 22,055 78 | – | – | – |
| | $204,748 92 | $204,748 92 | $150,292 97 | $7,890 47 |

---

[1] Architects' fees are on account of the cost of the preparation of plans and specifications for use of Legislature, but on account of no appropriation being made this expense was paid from the current funds.

[2] Includes balance brought forward Dec. 1, 1909, $542.97.

### *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| By cash on hand Dec. 1, 1909, | – | $11,719 89 |
| By institution receipts Nov. 30, 1910, | – | 40,290 71 |
| By State Treasurer receipts Nov. 30, 1910, | – | 122,738 32 |
| By United States Treasurer receipts Nov. 30, 1910, | – | 30,000 00 |
| To total disbursements Nov. 30, 1910, | $182,693 14 | – |
| | $182,693 14 | $204,748 92 |
| Bills receivable Dec. 1, 1909, deducted, | – | 4,558 07 |
| Bills payable Dec. 1, 1909, deducted, | 1,724 68 | – |
| | $180,968 46 | $200,190 85 |
| Bills receivable Nov. 30, 1910, | – | 2,187 72 |
| Bills payable Nov. 30, 1910, | 1,668 77 | – |
| Balance, | 19,741 34 | – |
| | $202,378 57 | $202,378 57 |

### *Comparative Disbursements and Receipts for 1909–10.*

| Accounts. | Disbursements. | | Receipts. | |
|---|---|---|---|---|
| | 1909. | 1910. | 1909. | 1910. |
| Architects' fees, | – | $3,155 44 | – | – |
| Administration, | $5,041 39 | 4,729 04 | $173 15 | $30 07 |
| Agriculture, | 19,697 34 | 22,028 79 | 14,271 77 | 16,339 90 |
| Agricultural economics, | 6 95 | 112 60 | – | – |
| Agricultural education, | 5,204 17 | 5,047 21 | 13 90 | 15 91 |
| Botanical, | 1,320 99 | 994 05 | 611 90 | 259 34 |
| Chemical, | 3,152 00 | 2,137 73 | 1,775 82 | 2,075 14 |
| Dean's office, | 201 17 | 232 36 | – | 36 |
| Entomology, | 651 31 | 515 29 | 224 87 | 251 61 |
| English, | 372 37 | 539 69 | – | 1 00 |
| Extension work, | 6,206 95 | 12,336 03 | 1,475 27 | 1,745 63 |
| Floriculture, | 2,398 65 | 2,987 80 | 1,484 65 | 2,495 93 |
| Farm fire, | – | – | 2,469 64 | – |
| General horticulture, | 2,992 94 | 2,436 18 | 1,183 34 | 805 51 |
| General maintenance, | 33,518 04 | 32,405 40 | 11,162 75 | 10,739 37 |
| Graduate school, | 397 68 | 1,413 19 | – | – |
| Grounds, | 1,474 61 | 1,444 30 | 16 30 | 54 10 |
| Library, | 3,659 38 | 5,083 89 | 422 48 | 567 51 |
| Landscape gardening, | 231 62 | 258 21 | 162 00 | 123 90 |
| Market gardening, | 4,775 49 | 4,970 60 | 2,914 03 | 2,604 94 |
| Mathematics and physics, | 251 71 | 251 74 | – | 1 12 |
| Meteorology, | 65 20 | – | – | – |
| Military, | 943 75 | 1,657 52 | 126 87 | 53 25 |
| Options on land, | – | 125 00 | – | 115 00 |
| Physical education, | 149 77 | 566 41 | – | 137 85 |
| Political science, | – | 7 05 | – | – |
| Pomology, | 2,943 64 | 3,237 78 | 1,472 29 | 1,398 70 |
| President's office, | 832 58 | 721 91 | 63 29 | 15 25 |
| Registrar, | 176 61 | 249 12 | – | – |
| Salaries, | 63,353 96 | 71,124 91 | – | 143 32 |
| Treasurer's office, | 492 18 | 753 75 | 24 27 | 34 69 |
| Veterinary, | 1,042 00 | 777 42 | 148 00 | 5 90 |
| Zoölogical, | 237 97 | 392 73 | 322 60 | 275 41 |
| State Treasurer: — | | | | |
| Agricultural education, | – | – | 6,250 00 | 5,000 00 |
| Endowment fund, | – | – | 10,613 32 | 10,613 32 |
| Graduate school, | – | – | – | 2,500 00 |
| Heat and light, | – | – | 625 00 | – |
| Instruction, | – | – | 35,750 00 | 40,000 00 |
| Maintenance, | – | – | 15,000 00 | 33,000 00 |
| Extension department, | – | – | 6,250 00 | 8,125 00 |
| Scholarship fund, | – | – | 18,750 00 | 15,000 00 |
| Student labor, | – | – | – | 7,500 00 |
| Veterinary, | – | – | 1,250 00 | 1,000 00 |
| United States Treasurer: — | | | | |
| Morrill fund, | – | – | 16,666 67 | 16,666 67 |
| Nelson fund, | – | – | 10,000 00 | 13,333 33 |
| | $161,792 42 | $182,693 14 | $161,674 18 | $193,029 03 |
| Balance beginning fiscal year, | – | – | 11,838 13 | 11,719 89 |
| Balance at close, | 11,719 89 | 22,055 78 | – | – |
| | $173,512 31 | $204,748 92 | $173,512 31 | $204,748 92 |

## EXPERIMENT STATION.

### *Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1, 1909, to Nov. 30, 1910. | Receipts from Dec. 1, 1909, to Nov. 30, 1910. | Apportionment for Year ending Nov. 30, 1910. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $1,722 57 | $32 80 | $2,000 00 | $310 23 |
| Agricultural, | 5,286 14 | 2,963 67 | 2,500 00 | 177 53 |
| Asparagus, | 736 59 | – | 700 00 | —36 59 |
| Botanical, | 1,283 19 | 28 70 | 1,600 00 | 345 51 |
| Chemical, | 9,228 18 | 6,660 08 | 2,800 00 | 231 90 |
| Cranberry, | 1,504 29 | 1,958 54 | 1,000 00 | 1,454 25 |
| Entomological, | 562 81 | 1 20 | 800 00 | 238 39 |
| Fertilizer, | – | 5,880 00 | – | 5,880 00 |
| Freight, | 445 03 | 85 | 500 00 | 55 82 |
| Graves orchard, | 350 81 | 119 00 | 300 00 | 68 19 |
| Horticultural, | 1,530 18 | 2 37 | 1,450 00 | —77 81 |
| Library, | 289 62 | – | 300 00 | 10 38 |
| Meteorology, | 299 03 | – | 300 00 | 97 |
| Publications, | 1,953 86 | – | 3,200 00 | 1,246 14 |
| Salaries, | 31,438 00 | 15 52 | 31,825 36 | 402 88 |
| Treasurer's office, | 370 74 | – | 400 00 | 29 26 |
| Veterinary, | 218 64 | – | 250 00 | 31 36 |
| Hatch fund, | – | 15,000 00 | – | – |
| Adams fund, | – | 14,000 00 | – | – |
| State fund, | – | 10,500 00 | – | – |
| Feed law, | 3,580 61 | 3,000 00 | 5,148 50 | 1,567 89 |
| Cranberry association,[1] | 544 17 | 544 17 | – | – |
| Expert services, | 12 40 | 85 00 | – | 72 60 |
| Tobacco investigations, | 317 78 | – | 400 00 | 82 22 |
| | $61,674 64 | $60,791 90 | $55,473 86 | $12,205 52 |
| Balance beginning fiscal year, Dec. 1, 1909, | – | 6,682 68 | – | —114 40 |
| Balance on hand Nov. 30, 1910, | 5,799 94 | – | – | – |
| | $67,474 58 | $67,474 58 | $55,473 86 | $12,091 12 |

[1] Transferred to cranberry growers' contribution account.

### *Experiment Station Trust Fund.*

| Account. | Disbursements for Year ending Nov. 30, 1910. | Receipts for Year ending Nov. 30, 1910. | Balance on Hand. |
|---|---|---|---|
| Cranberry growers' contribution, | $471 47 | $728 87 | $257 40 |

### *Comparative Disbursements and Receipts for 1909–10.*

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1909. | 1910. | 1909. | 1910. |
| Administration, | $2,065 20 | $1,722 57 | $47 35 | $32 80 |
| Agricultural, | 4,578 09 | 5,286 14 | 2,010 46 | 2,963 67 |
| Asparagus, | 715 60 | 736 59 | – | – |
| Botanical, | 1,617 96 | 1,283 19 | 44 13 | 28 70 |
| Chemical, | 9,403 73 | 9,228 18 | 4,809 38 | 6,660 08 |
| Cranberry, | 459 56 | 1,504 29 | – | 1,958 54 |
| Entomological, | 495 58 | 562 81 | – | 1 20 |
| Fertilizer, | – | – | 5,505 00 | 5,880 00 |
| Freight, | 499 91 | 445 03 | 15 29 | 85 |
| Graves orchard, | 281 10 | 350 81 | – | 119 00 |
| Horticultural, | 1,719 44 | 1,530 18 | 1 15 | 2 37 |

*Comparative Disbursements and Receipts for 1909–10* — Concluded.

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1909. | 1910. | 1909. | 1910. |
| Library, | $343 11 | $289 62 | $8 87 | – |
| Meteorology, | 308 05 | 299 03 | – | – |
| Publications, | 2,031 81 | 1,953 86 | 107 98 | – |
| Salaries, | 27,842 23 | 31,438 00 | 153 08 | $15 52 |
| Treasurer's Office, | 319 82 | 370 74 | – | – |
| Veterinary, | 231 71 | 218 64 | – | – |
| Hatch fund, | – | – | 15,000 00 | 15,000 00 |
| Adams fund, | – | – | 12,000 00 | 14,000 00 |
| State fund, | – | – | 13,125 00 | 10,500 00 |
| Feed law, | 3,011 51 | 3,580 61 | 4,500 00 | 3,000 00 |
| Repairs, | 1 30 | – | – | – |
| Cranberry Association,[1] | – | 544 17 | – | 544 17 |
| Expert services, | – | 12 40 | – | 85 00 |
| Tobacco investigations, | – | 317 78 | – | – |
| | $55,925 71 | $61,674 64 | $57,327 69 | $60,791 90 |
| Balance beginning fiscal year, | – | – | 5,280 70 | 6,682 68 |
| Balance on hand Nov. 30, 1910, | 6,682 68 | 5,799 94 | – | – |
| | $62,608 39 | $67,474 58 | $62,608 39 | $67,474 58 |

[1] Transferred to cranberry growers' contribution account.

## AGRICULTURAL DIVISION.

*Disbursements and Receipts for Fiscal Year ending Nov. 30, 1910.*

| | Disbursements. | Receipts. |
|---|---|---|
| *Academic.* | | |
| Maintenance, | $99 74 | $0 64 |
| Equipment, | 114 99 | 7 76 |
| Student labor, | 133 11 | 45 |
| Miscellaneous, | 140 76 | 1 50 |
| Department totals, | $488 60 | $10 35 |
| Office, | $215 55 | $22 79 |
| *Farm.* | | |
| Labor, | $9,378 12 | $3,139 52 |
| Dairy, | 1,568 73 | 3,839 85 |
| Teams, | 1,353 26 | 27 00 |
| Cattle, | 4,559 02 | 7,352 65 |
| Horses, | 494 92 | 57 50 |
| Swine, | 213 25 | 377 47 |
| Field Crops, | 1,180 45 | 1,444 97 |
| Repairs, | 268 11 | – |
| Improvements, | 178 62 | 46 80 |
| Student labor, | 1,719 83 | 11 25 |
| Sundry, | 142 29 | 9 75 |
| Tools, | 268 04 | – |
| Department totals, | $21,324 64 | $16,306 76 |
| Division totals, | $22,028 79 | $16,339 90 |

## AGRICULTURAL DIVISION — *Concluded.*

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | | $16,339 90 |
| By bills receivable, | | 1,136 49 |
| By net apportionment, | | 5,825 00 |
| To total disbursements, | $22,028 79 | |
| To bills payable, | 499 74 | |
| To balance, | 772 86 | |
| | $23,301 39 | $23,301 39 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1909. | Nov. 30, 1910. |
|---|---|---|
| Inventory of produce, | $3,219 93 | $4,999 13 |
| Inventory of cattle, | 8,155 00 | 10,042 00 |
| Inventory of swine, | 182 00 | 340 00 |
| Inventory of horses, | 4,375 00 | 4,400 00 |
| | $15,931 93 | $19,781 13 |

## HORTICULTURAL DIVISION.

### *Disbursements and Receipts for Fiscal Year ending Nov. 30, 1910.*

| | Disbursements. | Receipts. |
|---|---|---|
| Market gardening, | $4,970 60 | $2,604 94 |
| General horticulture, | 2,436 18 | 805 51 |
| Floriculture, | 2,987 80 | 2,495 93 |
| Pomology, | 3,237 78 | 1,398 70 |
| Landscape gardening, | 258 21 | 123 90 |
| Totals, | $13,890 57 | $7,428 98 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | | $7,428 98 |
| By bills receivable, | | 883 70 |
| By apportionment, | | 7,100 00 |
| To total division disbursements, | $13,890 57 | |
| To total division bills payable, | 122 93 | |
| To balance unexpended, | 1,399 18 | |
| | $15,412 68 | $15,412 68 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1909. | Nov. 30, 1910. |
|---|---|---|
| Inventory of produce, | $410 40 | $496 00 |

## Inventory — Real Estate.

### *Land (Estimated Value).*

| | | |
|---|---|---|
| Baker place, | $2,500 00 | |
| Bangs place, | 2,350 00 | |
| Clark place, | 4,500 00 | |
| College farm, | 37,000 00 | |
| Harlow farm, | 3,284 63 | |
| Kellogg farm, | 5,868 45 | |
| Louisa Baker place, | 5,636 91 | |
| Old creamery place, | 1,726 25 | |
| Pelham quarry, | 500 00 | |
| Westcott place, | 2,250 00 | |
| Allen place, | 500 00 | |
| Charmbury place, | 450 00 | |
| Loomis place, | 415 00 | |
| Hawley & Brown place, | 675 00 | $67,656 24 |

### *College Buildings (Estimated Value).*

| | | |
|---|---|---|
| Chemical laboratory, | $8,200 00 | |
| Clark hall, | 67,400 00 | |
| Dining hall, | 35,450 00 | |
| Drill hall, | 7,000 00 | |
| Durfee plant house and fixtures, | 10,000 00 | |
| Dwelling houses purchased with farm, | 5,100 00 | |
| Entomology building, | 80,000 00 | |
| Farmhouse, | 2,050 00 | |
| French hall, | 17,000 00 | |
| Glass house range, | 15,000 00 | |
| Graves house and barn, | 1,560 00 | |
| Gun shed and bath room, | 2,500 00 | |
| Hay storage barn and silo, | 30,000 00 | |
| Horse barn, | 5,020 00 | |
| Horticultural barn, | 2,525 00 | |
| Insectary, | 5,800 00 | |
| Mathematical building, | 5,600 00 | |
| North dormitory, | 25,400 00 | |
| Power house, | 13,000 00 | |
| Powder house, | 75 00 | |
| President's house, | 12,000 00 | |
| Small plant house, with vegetable cellar and cold grapery, | 4,700 00 | |
| South dormitory, | 35,500 00 | |
| Stone chapel, | 30,225 00 | |
| Tool house, | 2,000 00 | |
| Veterinary laboratory and stable, | 22,995 60 | |
| Wilder Hall, | 37,300 00 | |
| Young stock barn, | 6,500 00 | |
| | | 489,900 60 |
| *Amount carried forward,* | | $557,556 84 |

### *College Equipment (Estimated Value).*

| | | |
|---|---|---|
| *Amount brought forward,* | | $557,556 84 |
| Agricultural division: — | | |
| Academic, | $3,742 14 | |
| Dairy school, | 1,735 14 | |
| Farm, | 27,053 84 | |
| Agricultural education, | 607 21 | |
| Botanical department, | 7,468 47 | |
| Chemical laboratory, | 4,634 50 | |
| College supplies, | 146 05 | |
| Dean's office, | 277 80 | |
| Dining hall, | 3,029 63 | |
| Entomological laboratory, | 4,158 15 | |
| Extension department, | 952 05 | |
| Fire apparatus, | 623 20 | |
| Floriculture, | 5,690 73 | |
| General horticulture, | 8,603 55 | |
| General maintenance, | 64,369 57 | |
| Landscape gardening, | 4,286 65 | |
| Language and literature, | 189 01 | |
| Library, | 54,679 55 | |
| Market gardening, | 699 00 | |
| Military, | 1,153 80 | |
| Pomology, | 1,335 43 | |
| Physical education, | 2,136 04 | |
| Physics and mathematics, | 5,679 50 | |
| President's office, | 938 83 | |
| Registrar's office, | 292 20 | |
| Treasurer's office, | 926 00 | |
| Trophy room, | 1,273 85 | |
| Veterinary laboratory, | 7,879 97 | |
| Water mains, | 7,810 00 | |
| Zoölogical laboratory, | 8,647 79 | |
| Zoölogical museum, | 5,689 73 | |
| | | 236,709 38 |

### *Experiment Station Buildings (Estimated Value).*

| | | |
|---|---|---|
| Agricultural laboratory, | $9,000 00 | |
| Chemical laboratory (plant and animal chemistry), | 20,000 00 | |
| Entomological laboratory, | 850 00 | |
| | | 29,850 00 |

### *Experiment Station Equipment (Estimated Value).*

| | | |
|---|---|---|
| Agricultural laboratory, | $7,303 65 | |
| Botanical laboratory, | 4,193 44 | |
| Chemical laboratory, | 19,661 18 | |
| Director's office, | 3,200 50 | |
| Entomological laboratory, | 21,904 15 | |
| Horticultural laboratory, | 1,058 20 | |
| Meteorology laboratory, | 1,304 80 | |
| Treasurer's office, | 480 50 | |
| | | 59,106 42 |
| | | $883,222 64 |

## *Inventory Summary.*

| | | |
|---|---|---|
| Land, | $67,656 24 | |
| College buildings, | 489,900 60 | |
| College equipment, | 236,709 38 | |
| Experiment station buildings, | 29,850 00 | |
| Experiment station equipment, | 59,106 42 | |
| | | $883,222 64 |

## Students' Trust Funds Accounts.

| Accounts. | Disbursements for Year ending Nov. 30, 1910. | Receipts for Year ending Nov. 30, 1910. | Balance brought forward Dec. 1, 1909. | Balance on Hand Nov. 30, 1910. |
|---|---|---|---|---|
| Athletics, | $2,116 88 | $4,676 79 | $10 00 | $2,569 91 |
| Dining hall, | 41,698 17 | 40,910 28 | —5,658 36 | —6,446 25 |
| College signal, | 1,549 98 | 1,629 86 | 333 20 | 413 08 |
| Keys, | 48 25 | 43 50 | 33 75 | 29 00 |
| Creamery house, | 167 76 | 184 43 | 24 54 | 41 21 |
| Student deposits, | 3,539 42 | 3,266 15 | 447 63 | 174 36 |
| Harlow farm, | 287 78 | 302 77 | —42 51 | —27 52 |
| Trophy room tax, | 790 99 | 702 97 | 364 25 | 276 23 |
| Kellogg farm, | 327 21 | 417 75 | —22 42 | 68 12 |
| Text-books, | 3,627 19 | 3,577 56 | 1,154 22 | 1,104 59 |
| Uniforms, | 1,551 28 | 1,755 20 | 1,527 78 | 1,731 70 |
| Musical association, | 72 46 | 79 53 | 23 75 | 30 82 |
| Louisa Baker farm, | – | 25 00 | 188 14 | 213 14 |
| | $55,777 37 | $57,571 79 | —$5,723 29 | $6,652 16 |
| Balance on hand Dec. 1, 1909, | 1,616 03 | – | 4,107 26 | —6 473 77 |
| Balance on hand Nov. 30, 1910, | – | 178 39 | – | – |
| | $57,393 40 | $57,393 40 | —$1,616 03 | $178 39 |

## Detailed Statement of Dining Hall.

| | Liabilities. | Resources. |
|---|---|---|
| Dec. 1, 1909, cash overdraft, | $5,658 36 | – |
| Nov. 30, 1910, provisions purchased, | 41,698 17 | – |
| Nov. 30, 1910, outstanding bills, | 1,224 11 | – |
| Nov. 30, 1910, total collections, | – | $40,910 28 |
| Nov. 30, 1910, total collections outstanding, | – | 2,856 26 |
| Nov. 30, 1910, inventory, | – | 2,922 89 |
| Balance, | – | 1,891 21 |
| | $48,580 64 | $48,580 64 |

## Endowment Fund.[1]

| | Principal. | Income. |
|---|---|---|
| United States grant (5 per cent.), | $219,000 00 | $7,300 00 |
| Commonwealth grant (3½ per cent.), | 142,000 00 | 3,313 32 |
| | | $10,613 32 |

---

[1] This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

## BENEFICIARY FUNDS.

### *Burnham Emergency Fund.*

| | | Market Value Dec. 1, 1910. | Par Value. | Income. |
|---|---|---|---|---|
| Two Lake Shore & Michigan Southern Railroad gold notes, at $1,000,* | | – | $2,000 00 | $50 00 |
| Two bonds American Telephone and Telegraph Company 4s, at $910, | | $1,820 00 | 2,000 00 | 80 00 |
| Two bonds Western Electric Company 5s, at $1,000, | | 2,000 00 | 2,000 00 | 50 00 |
| One bond United Fruit Company 5s, | | 1,010 00 | 1,000 00 | 50 00 |
| | | $4,830 00 | $7,000 00 | $230 00 |
| *On Feb. 1, 1910: —<br>Two Lake Shore & Michigan Southern Railroad bonds were sold for | $2,000 00 | – | —2,000 00 | – |
| Two Western Electric Company bonds were purchased for | 1,996 67 | – | – | 3 33 |
| Unexpended balance Dec., 1909, | | – | – | 382 62 |
| | | $4,830 00 | $5,000 00 | $615 95 |
| Disbursements for fiscal year ending Nov. 30, 1910, | | – | – | 215 05 |
| Cash on hand Dec. 1, 1910, | | – | – | $400 90 |

### *Library Fund.*

| | | | |
|---|---|---|---|
| Five bonds Lake Shore & Michigan Southern Railroad Company 4s, at $93½, | $4,675 00 | $5,000 00 | $200 00 |
| Five bonds New York Central & Hudson River Railroad Company 4s, at $93½, | 4,675 00 | 5,000 00 | 200 00 |
| Two shares New York Central & Hudson River Railroad Company stock, at $112, | 224 00 | 200 00 | 11 50 |
| Sale of rights of New York Central & Hudson River Railroad Company stock, | – | – | 12 90 |
| Amherst Savings Bank, deposit, | 167 77 | 167 77 | 6 68 |
| | $9,741 77 | $10,367 77 | $431 08 |
| Transferred to college library account, | – | – | 431 08 |

## SPECIAL FUNDS.

### *Endowed Labor Fund (the Gift of a Friend of the College).*

| | Market Value Dec. 1, 1910. | Par Value. | Income. |
|---|---|---|---|
| Two bonds American Telephone and Telegraph Company 4s, at $93½, | $1,870 00 | $2,000 00 | $80 00 |
| Two bonds Lake Shore & Michigan Southern Railroad Company 4s, at $93½, | 1,870 00 | 2,000 00 | 80 00 |
| One bond New York Central Railroad debenture 4s, | 935 00 | 1,000 00 | 40 00 |
| Amherst Savings Bank, deposit, | 143 39 | 143 39 | 5 72 |
| | $4,818 39 | $5,143 39 | $205 72 |
| Gift of a friend, Hon. Lucius Tuttle, | – | – | 100 00 |
| Unexpended balance Dec. 1, 1909, | – | – | 680 67 |
| Cash on hand Dec. 1, 1910, | – | – | $986 39 |

## SPECIAL FUNDS — *Continued.*

### *Whiting Street Scholarship Fund.*

| | Market Value Dec. 1, 1910. | Par Value. | Income. |
|---|---|---|---|
| One bond New York Central debenture 4s, . . . . | $935 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, . . . . . . | 271 64 | 271 64 | 10 84 |
| | $1,206 64 | $1,271 64 | $50 84 |
| Unexpended balance Dec. 1, 1909, . . . . . | – | – | 36 79 |
| | | | $87 63 |
| Disbursements for scholarships for fiscal year ending Nov. 30, 1910, . . . . . . . . . . | – | – | 30 00 |
| Cash on hand Dec. 1, 1910, . . . . . . | – | – | $57 63 |

### *Hills Fund.*

| | | | |
|---|---|---|---|
| Northampton Institution for Savings, deposit, . . | $1,180 00 | $1,180 00 | $44 66 |
| One bond American Telephone and Telegraph Company 4s, . . . . . . . . . . . . | 910 00 | 1,000 00 | 40 00 |
| One bond New York Central & Hudson River Railroad debenture 4s, . . . . . . . . . . | 935 00 | 1,000 00 | 40 00 |
| One bond New York Central & Hudson River Railroad Company 3½s, . . . . . . . . . . | 840 00 | 1,000 00 | 35 00 |
| One bond New York Central & Hudson River Railroad gold note, 5 per cent.,* . . . . . . . . | – | 1,000 00 | 25 00 |
| One bond Western Electric Company 5s, . . . . | 1,000 00 | 1,000 00 | 25 00 |
| One bond Metropolitan Street Railway, Kansas City, 5 per cent., . . . . . . . . . . . . | 980 00 | 1,000 00 | 50 00 |
| Three bonds Pacific Telephone and Telegraph Company 5s, at $98, . . . . . . . . . . . | 2,940 00 | 3,000 00 | 150 00 |
| Exchange on Metropolitan Street Railway bond, . . | – | – | 20 00 |
| Boston & Albany Railroad stocks, at $224, . . . | 812 00 | 362 00 | 31 68 |
| Amherst Savings Bank, deposit, . . . . . . | 72 75 | 72 75 | 2 88 |
| | $9,669 75 | $10,614 75 | $464 22 |
| *On Feb. 1, 1910: — | | | |
| One New York Central & Hudson River gold note was sold for . . . . . $1,000 00 | – | —1,000 00 | – |
| One bond Western Electric Company 5s was purchased for . . . . . . 998 33 | – | – | 1 67 |
| Unexpended balance Dec. 1, 1909, . . . . . . | – | – | 379 70 |
| | $9,669 75 | $9,614 75 | $845 59 |
| Disbursements by horticultural and botanical departments for fiscal year ending Nov. 30, 1910, . . . | – | – | 227 13 |
| Cash on hand Dec. 1, 1910, . . . . . . | – | – | $618 46 |

### *Mary Robinson Fund.*

| | | | |
|---|---|---|---|
| Northampton Institution for Savings, deposit, . . | $820 00 | $820 00 | $31 04 |
| Boston & Albany Railroad stock, at $224, . . . . | 84 00 | 38 00 | 3 32 |
| | $904 00 | $858 00 | $34 36 |
| Unexpended balance Dec. 1, 1909, . . . . . . | – | – | 21 17 |
| Cash on hand Dec. 1, 1910, . . . . . . | – | – | $55 53 |

## SPECIAL FUNDS — *Concluded.*

### *Grinnell Prize Fund.*

| | Market Value Dec. 1, 1910. | Par Value. | Income. |
|---|---|---|---|
| Ten shares New York Central & Hudson River Railroad stock, | $1,120 00 | $1,000 00 | $57 50 |
| Sale of rights of New York Central & Hudson River Railroad Company's stock, | – | – | 64 50 |
| | | | $122 00 |
| Unexpended balance Dec. 1, 1909, | – | – | 121 24 |
| | | | $243 24 |
| Disbursements for prizes, | – | – | 50 00 |
| Cash on hand Dec. 1, 1910, | – | – | $193 24 |

### *Gassett Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central debenture 4s, at $93½, | $935 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, | 11 64 | 11 64 | 44 |
| | $946 64 | $1,011 64 | $40 44 |
| Unexpended balance Dec. 1, 1909, | – | – | 33 43 |
| | | | $73 87 |
| Disbursements for scholarships for fiscal year ending Nov. 30, 1910, | – | – | 37 50 |
| Cash on hand Dec. 1, 1910, | – | – | $36 37 |

### *Massachusetts Agricultural College (Investment).*

| | | | |
|---|---|---|---|
| One share New York Central & Hudson River Railroad stock, | $112 00 | $100 00 | $5 75 |
| Sale of rights of New York Central & Hudson River Railroad Company's stock, | – | – | 6 45 |
| | | | $12 20 |
| Unexpended balance Dec. 1, 1909, | – | – | 38 00 |
| Cash on hand Dec. 1, 1910, | – | – | $50 20 |

### *Danforth Keyes Bangs Fund.*

| | | | |
|---|---|---|---|
| Two bonds Pacific Telephone and Telegraph Company 5s, at $98, | $1,960 00 | $2,000 00 | $100 00 |
| Two bonds American Telephone and Telegraph Company 4s, at $91, | 1,820 00 | 2,000 00 | 80 00 |
| Two bonds Union Electric Light and Power Company 5s, at $99, | 1,980 00 | 2,000 00 | 100 00 |
| Interest received from loan, | – | – | 1 25 |
| | $5,760 00 | $6,000 00 | $281 25 |
| Unexpended balance Dec. 1, 1909, | – | – | 234 04 |
| | – | – | $515 29 |
| Loan to students outstanding, | – | – | 170 00 |
| Cash on hand Dec. 1, 1910, | – | – | $345 29 |

### *John C. Cutter Fund.*

| | | Market Value Dec. 1. 1910. | Par Value. | Income. |
|---|---|---|---|---|
| One bond Pacific Telephone and Telegraph Company 5s, at $98,* | | $980 00 | $1,000 00 | $25 00 |
| *Amount of John C. Cutter fund, | $1,000 00 | – | – | – |
| One Pacific Telephone and Telegraph bond, | 996 67 | – | – | 3 33 |
| Cash on hand Dec. 1, 1910, | | – | – | $28 33 |

### Summary of Balances on Hand of the Income from Funds Held in Trust by the Massachusetts Agricultural College.

| | |
|---|---|
| Burnham emergency fund, | $400 90 |
| Endowed labor fund, | 986 39 |
| Whiting Street scholarship fund, | 57 63 |
| Hills fund, | 618 46 |
| Mary Robinson fund, | 55 53 |
| Grinnell prize fund, | 193 24 |
| Gassett scholarship fund, | 36 37 |
| Massachusetts Agricultural College investment, | 50 20 |
| Danforth Keyes Bangs fund, | 345 29 |
| John C. Cutter fund, | 28 33 |
| | $2,772 34 |

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the treasurer, Fred C. Kenney, for the year ending Nov. 30, 1910. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHARLES A. GLEASON,
*Auditor.*

Amherst, Dec. 12, 1910.

### History of Special Funds.

| | |
|---|---|
| Burnham emergency fund: — A bequest from T. O. H. P. Burnham of Boston, made without any conditions. The trustees of the college have voted that the fund be kept intact, and that the income from it be used for the college for such purposes as they believe to be for its best interest, | $5,000 00 |
| Library fund: — The library of the college at the present time contains about 30,000 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave $2,000; Jan. 1, 1894, Charles L. Flint gave $1,000; in 1887 Elizur Smith of Lee, Mass., gave $1,215. These were the largest bequests, and amount now to . | 10,000 00 |

| | |
|---|---|
| Endowed labor fund: — | |
| Gift of a friend of the college in 1901, income of which is to be used for the assistance of needy and deserving students, | $5,000 00 |
| Whiting Street scholarship: — | |
| Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship, | 1,000 00 |
| Hills fund: — | |
| Gift of Leonard M. and Henry F. Hills, in 1867, to establish and maintain a botanic garden, | 10,000 00 |
| Mary Robinson fund: — | |
| Gift of Miss Mary Robinson of Medfield, in 1874, for scholarship, | 1,000 00 |
| Grinnell prize fund: — | |
| Gift of Hon. Wm. Claflin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York, | 1,000 00 |
| Gassett scholarship fund: — | |
| Gift of Henry Gassett of Boston, the income to be used for scholarship, | 1,000 00 |
| Massachusetts Agricultural College investment fund: — | |
| Investment made by vote of trustees, in 1893; to purchase one share New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate, | 100 00 |
| Danforth Keyes Bangs fund: — | |
| Gift on account of the Louisa Baker estate, April 14, 1909, the income thereof to be used annually in aiding poor, industrious and deserving students to obtain an education in said college, | 6,000 00 |
| John C. Cutter fund: — | |
| Gift of Dr. John C. Cutter, an alumnus of the college, who died in August, 1909, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene, | 1,000 00 |
| | $41,100 00 |

### Prizes.

| | |
|---|---|
| Special prize, for best work done in entomology by undergraduates. This prize is given by the alumni entomologists, . . . . . . . . . | $30 00 |
| Special prize, in honor of J. W. D. French, given by the Bay State Agricultural Society, for the best essay on forestry from the senior class, . . . . . | 25 00 |
| Special prize, given by the Western Alumni Association to that member of the sophomore class who during his first two years has shown the greatest improvement in scholarship, character and example, . . . . . | 25 00 |
| | $80 00 |

FRED C. KENNEY,
*Treasurer.*

# THE M. A. C. BULLETIN

AMHERST, MASS.

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OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE,

## 1910-1911.

## FORTY-EIGHTH ANNUAL REPORT.

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# MASSACHUSETTS AGRICULTURAL COLLEGE,

## AMHERST.

Report

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Vacations and holidays are indicated by light-faced type.

## 1910.

### JULY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | .. | .. | .. | .. | .. | .. |

### AUGUST.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### SEPTEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | **14** | **15** | **16** | **17** |
| **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| **25** | **26** | **27** | **28** | **29** | **30** | .. |
| .. | .. | .. | .. | .. | .. | .. |

### OCTOBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | .. | **1** |
| **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **16** | **17** | **18** | **19** | **20** | **21** | **22** |
| **23** | **24** | **25** | **26** | **27** | **28** | **29** |
| **30** | **31** | .. | .. | .. | .. | .. |

### NOVEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | **1** | **2** | **3** | **4** | **5** |
| **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| **13** | **14** | **15** | **16** | **17** | **18** | **19** |
| **20** | **21** | **22** | **23** | 24 | 25 | 26 |
| 27 | **28** | **29** | **30** | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### DECEMBER.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | **1** | **2** | **3** |
| **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **11** | **12** | **13** | **14** | **15** | **16** | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| .. | .. | .. | .. | .. | .. | .. |

## 1911.

### JANUARY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| 1 | **2** | **3** | **4** | **5** | **6** | **7** |
| **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| **15** | **16** | **17** | **18** | **19** | **20** | **21** |
| **22** | **23** | **24** | **25** | **26** | **27** | **28** |
| **29** | **30** | **31** | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### FEBRUARY.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | **1** | **2** | **3** | **4** |
| **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **12** | **13** | **14** | **15** | **16** | **17** | **18** |
| **19** | **20** | **21** | 22 | **23** | **24** | **25** |
| **26** | **27** | **28** | .. | .. | .. | .. |
| .. | .. | .. | .. | .. | .. | .. |

### MARCH.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | **1** | **2** | **3** | **4** |
| **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **12** | **13** | **14** | **15** | **16** | **17** | **18** |
| **19** | **20** | **21** | **22** | **23** | **24** | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | .. |
| .. | .. | .. | .. | .. | .. | .. |

### APRIL.

| S | M | T | W | Th | F | S |
|---|---|---|---|---|---|---|
| .. | .. | .. | .. | .. | .. | 1 |
| 2 | **3** | **4** | **5** | **6** | **7** | **8** |
| **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **16** | **17** | **18** | 19 | **20** | **21** | **22** |
| **23** | **24** | **25** | **26** | **27** | **28** | **29** |
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### MAY.

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### JUNE.

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### JULY.

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### AUGUST.

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### SEPTEMBER.

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### OCTOBER.

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| **15** | **16** | **17** | **18** | **19** | **20** | **21** |
| **22** | **23** | **24** | **25** | **26** | **27** | **28** |
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### NOVEMBER.

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| **19** | **20** | **21** | **22** | **23** | **24** | **25** |
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### DECEMBER.

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## 1912.

### JANUARY.

| S | M | T | W | Th | F | S |
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### FEBRUARY.

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| **18** | **19** | **20** | **21** | 22 | **23** | **24** |
| **25** | **26** | **27** | **28** | **29** | .. | .. |
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### MARCH.

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| **17** | **18** | **19** | **20** | **21** | **22** | **23** |
| **24** | **25** | **26** | **27** | **28** | **29** | 30 |
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### APRIL.

| S | M | T | W | Th | F | S |
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| **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **21** | **22** | **23** | **24** | **25** | **26** | **27** |
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### MAY.

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| **19** | **20** | **21** | **22** | **23** | **24** | **25** |
| **26** | **27** | **28** | **29** | 30 | **31** | .. |
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### JUNE.

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| **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| **16** | **17** | **18** | **19** | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | .. | .. | .. | .. | .. | .. |

# THE MASSACHUSETTS AGRICULTURAL COLLEGE.

Beginning with this issue, the catalogue represents a statement of the courses of study, and the status of the college, for the current college year, unless the contrary is indicated in the text. Announcement of changes affecting the work of the following year will be made later.

# Calendar.

## 1911-1912.

### Regular Courses.

**1911.**

| | |
|---|---|
| January 2, Monday, 1 P.M., | Winter recess ends; chapel. |
| January 30, Monday, | Semester examinations begin. |
| February 6, Monday, 1 P.M., | Second semester begins; chapel. |
| February 22, Wednesday, | Half holiday, Washington's Birthday. |
| March 24, Friday, 6 P.M., | Spring recess begins. |
| April 3, Monday, 1 P.M., | Spring recess ends; chapel. |
| April 19, Wednesday, | Half holiday, Patriot's Day. |
| May 30, Tuesday, | Holiday, Memorial Day. |
| June 5, Monday, | Senior examinations begin. |
| June 12, Monday, | Non-senior examinations begin. |
| June 17–21, Saturday–Wednesday, | Commencement. |
| June 21–24, Wednesday–Saturday, | Entrance examinations. |

Summer Vacation.

| | |
|---|---|
| September 11–13, Monday–Wednesday, | Condition examinations. |
| September 11–14, Monday–Thursday, | Entrance examinations. |
| September 13, Wednesday, 1.30 P.M., | First semester begins; assembly. |
| October 12, Thursday, | Half holiday, Columbus Day. |
| November 29–December 4, Wednesday, 1 P.M.–Monday, 1 P.M., chapel, | Thanksgiving recess. |
| December 15, Friday, 6 P.M., | Winter recess begins. |

**1912.**

| | |
|---|---|
| January 1, Monday, 1 P.M., | Winter recess ends; chapel. |
| January 29, Monday, | Semester examinations begin. |
| February 5, Monday, 1 P.M., | Second semester begins; chapel. |
| February 22, Thursday, | Half holiday, Washington's Birthday. |
| March 29, Friday, 6 P.M., | Spring recess begins. |
| April 8, Monday, 1 P.M., | Spring recess ends; chapel. |
| April 19, Friday, | Half holiday, Patriot's Day. |
| May 30, Thursday, | Holiday, Memorial Day. |
| June 3, Monday, | Senior examinations begin. |
| June 10, Monday, | Non-senior examinations begin. |
| June 15–19, Saturday–Wednesday, | Commencement. |
| June 19–22, Wednesday–Saturday, | Entrance examinations. |

### Short Courses, 1911.

Ten weeks' general course, January 3–March 10.

Two weeks' course in poultry management, February 26–March 10.

Farmers' week, March 13–March 17.

Beekeeping course, May 24–June 7.

Summer school begins July 3.

## ERRATA AND ADDENDA.

Page 15. — After "Guy Chester Crampton," insert "J. C. Graham, B.Sc., Associate Professor of Poultry Husbandry, beginning Feb. 15, 1911."

Page 16. — "Marcus T. Smulyan" (not Smulyou); the name should appear under "Graduate Assistants."

Page 17. — Under "Additional Instructors," omit name of "J. W. Wellman."

Pages 41, 42. — The tables state inaccurately the credits in freshman, sophomore and junior physical education and military science. These credits should be: —

*Freshman Year.* — Semester 1: Drill, 1 hour. Semester 2: Drill, 1 hour; Physical Education, 1 hour.

*Sophomore and Junior Year (Each).* — Semester 1: Drill, 1 hour; Tactics, 1 hour. Semester 2: Drill, 1 hour; Tactics, 1 hour; Physical Education, 1 hour.

The footings of the credit-hour columns should therefore read: —

*Freshman Year.* — Semester 1, 18 or 19.

*Sophomore Year.* — Semester 2, 20 or 18.

Page 57. — *Department of Entomology.* In name-list, after "Professor Fernald," insert "Associate Professor Crampton."

Page 64, footnote 2. — Add "Stephen Hamblin (second semester)."

Page 79. — *Department of Rural Social Science.* To name-list add "Mr. Holcomb."

Page 82. — *Department of Veterinary Science.* To name-list add "Mr. Larsen."

# MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the colleges organized under the national land grant act of 1862. This act gave public lands to the several States and Territories for the establishment of colleges for the benefit of agriculture and the mechanic arts; it was framed by the late Senator Justin Smith Morrill of Vermont. For our own college, liberal appropriations are also made by the Legislature of Massachusetts.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to an entering class of 33. In January, 1875, an arrangement was made with the authorities of Boston University under which the college, without losing its independence, became the school of agriculture of the university. Under this arrangement, graduates of the Massachusetts Agricultural College may, upon certain conditions, receive the diploma in science awarded to graduates of the university. In 1882 the State experiment station was located at the college. It has since been incorporated with the college.

COURSES. — The college offers a free education to any American student who may fulfill the requirements of admission. Women are admitted on the same standing as men. Foreign students pay a tuition fee. The four-years course leads to the degree of bachelor of science, and graduate courses are given leading to the degrees of master of science and of doctor of philosophy. Winter courses of ten weeks are offered, and, upon announcement, special courses. There is also a summer school of agriculture, designed chiefly for persons desiring to teach agriculture in the elementary and high schools.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement, the term "agricultural" is used in the broadest sense. Courses are offered which give efficiency in various practical pursuits, such as general farming, dairying, the management of estates, fruit growing, glass farming, landscape gardening, forestry and arboriculture. Students also qualify for positions in institutions designed for investigation in the many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for business occupations having connection with the farm and needing expert service.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences — particularly chemistry, physics, mathematics and engineering — are an essential preparation. Still other students find the course a splendid general education, without regard to future occupation. The course is well balanced; each student is required to study English, a modern foreign language, literature, political science and history.

LOCATION AND EQUIPMENT. — Situated in the beautiful town of Amherst, the college has an inspiring outlook. The campus is especially attractive. The grounds comprise more than 475 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst, 97 miles west of Boston, is on the Central Vermont Railroad and the Central Massachusetts division of the Boston & Maine Railroad. Electric car lines connect the village with Northampton, Holyoke, Springfield and other cities. The town library is open to students, in addition to the college library, as are also good courses of lectures and concerts in the village, supplementing the various interests of college life.

# THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

# The Corporation.

## Members of the Corporation.

| | TERM EXPIRES |
|---|---|
| Davis R. Dewey of Cambridge, | 1912 |
| M. Fayette Dickinson of Brookline, | 1912 |
| William H. Bowker of Concord, | 1913 |
| George H. Ellis of West Newton, | 1913 |
| Charles E. Ward of Buckland, | 1914 |
| Elmer D. Howe of Marlborough, | 1914 |
| Nathaniel I. Bowditch of Framingham, | 1915 |
| William Wheeler of Concord, | 1915 |
| Arthur G. Pollard of Lowell, | 1916 |
| Charles A. Gleason of New Braintree, | 1916 |
| Frank Gerrett of Greenfield, | 1917 |
| Harold L. Frost of Arlington, | 1917 |
| Charles H. Preston of Danvers, | 1918 |
| Frank A. Hosmer of Amherst, | 1918 |

## Members Ex Officio.

His Excellency Governor Eugene N. Foss, *President of the Corporation.*
Kenyon L. Butterfield, *President of the College.*
David Snedden, *State Commissioner of Education.*
J. Lewis Ellsworth, *Secretary of the State Board of Agriculture.*

## Officers of the Corporation.

His Excellency Governor Eugene N. Foss of Boston, *President.*
Charles A. Gleason of Springfield, *Vice-President.*
J. Lewis Ellsworth of Worcester, *Secretary.*
Fred C. Kenney of Amherst, *Treasurer.*
Charles A. Gleason of Springfield, *Auditor.*

## Standing Committees of the Corporation.[1]

### *Committee on Finance.*

Charles A. Gleason, *Chairman.*
George H. Ellis.
Nathaniel I. Bowditch.
Arthur G. Pollard.
Charles E. Ward.
Frank A. Hosmer.

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[1] The president of the college is ex officio member and secretary of standing committees. The director of the experiment station is a member of the committee on experiment department, without vote.

### *Committee on Course of Study and Faculty.*

William Wheeler, *Chairman.*
William H. Bowker.
M. Fayette Dickinson.
David Snedden.
Elmer D. Howe.
Davis R. Dewey.
Frank A. Hosmer.

### *Committee on Farm.*

George H. Ellis, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
Nathaniel I. Bowditch.

### *Committee on Horticulture.*

J. Lewis Ellsworth, *Chairman.*
Davis R. Dewey.
Elmer D. Howe.
Harold L. Frost.

### *Committee on Experiment Department.*

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
Arthur G. Pollard.
Charles E. Ward.
Harold L. Frost.

### *Committee on Buildings and Arrangement of Grounds.*

M. Fayette Dickinson, *Chairman.*
William Wheeler.
Frank Gerrett.
William H. Bowker.
Charles H. Preston.

### *Examining Committee of Overseers.*

John Bursley of West Barnstable.
Isaac Damon of Wayland.
N. B. Turner of Great Barrington.
Frank P. Newkirk of Easthampton.
William E. Patrick of Warren.

# OFFICERS OF THE INSTITUTION.

## THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

KENYON L. BUTTERFIELD, A.M., LL.D., . . . President's House.
President of the College and Professor of Rural Sociology.

GEORGE F. MILLS,[1] M.A., . . . . . . . . 46 Amity Street.
Dean of the College, Head of the Division of the Humanities and Professor of Languages and Literature.

CHARLES H. FERNALD, Ph.D., . . . . . . 3 Hallock Street.
Honorary Director of the Graduate School.

WILLIAM P. BROOKS, Ph.D., . . . . . 28 Northampton Road.
Director of the Experiment Station and Lecturer on Soil Fertility.

WILLIAM D. HURD, M.Agr., . . . . . . 82 Pleasant Street.
Director of Extension Work.

FRANK A. WAUGH, M.Sc., . . . Massachusetts Agricultural College.
Head of the Division of Horticulture and Professor of Landscape Gardening.

JAMES A. FOORD, M.Sc., . . . . . . . . Nutting Avenue.
Head of the Division of Agriculture and Professor of Farm Administration.

CHARLES WELLINGTON, Ph.D., . . . . . . . 34 Amity Street.
Professor of General and Agricultural Chemistry.

JAMES B. PAIGE, B.Sc., D.V.S., . . . . . . 42 Lincoln Avenue.
Professor of Veterinary Science, and Acting Dean.

GEORGE E. STONE, Ph.D., . . . . . . . . Mount Pleasant.
Professor of Botany.

JOHN E. OSTRANDER, A.M., C.E., . . . . 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

HENRY T. FERNALD, Ph.D., . . . . . . . 44 Amity Street.
Acting Director of the Graduate School and Professor of Entomology.

GEORGE C. MARTIN, C.E., Captain, 18th U. S. Infantry,
35 North Prospect Street.
Professor of Military Science and Tactics.

EDWARD A. WHITE, B.Sc., . . . . . . . . Mount Pleasant.
Professor of Floriculture.

WILLIAM R. HART, A.M., . . . . . . . 97 Pleasant Street.
Professor of Agricultural Education.

FRED C. SEARS, M.Sc., . . . . . . . . . Mount Pleasant.
Professor of Pomology.

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[1] Absent on leave.

FRED C. KENNEY, . . . . . . . . . . Mount Pleasant.
Treasurer of the College.

PHILIP B. HASBROUCK, B.Sc., . . . . . . 130 Pleasant Street.
Registrar of the College, Associate Professor of Mathematics and Adjunct Professor of Physics.

ROBERT WILSON NEAL, A.M., . . . . . . 7 Woodside Avenue.
Associate Professor of English.

JOSEPH S. CHAMBERLAIN, Ph.D., . . . . . 16 North Prospect Street.
Associate Professor of Chemistry.

WILLIAM P. B. LOCKWOOD, B.Sc.Agr., . . . 5 East Pleasant Street.
Associate Professor of Dairying.

FRANK F. MOON, B.A., M.F., . . . . . . . 6 Allen Street.
Associate Professor of Forestry.

JOHN ALLEN MCLEAN,[1] B.A., B.S., A., . . . . . . —— ——
Associate Professor of Animal Husbandry.

GUY CHESTER CRAMPTON,[2] Ph.D., . . . . . . . —— ——
Associate Professor of Entomology.

S. FRANCIS HOWARD, M.Sc., . . . . . . . 10 Allen Street.
Assistant Professor of Chemistry.

A. VINCENT OSMUN, M.Sc., . . . . . . North Amherst, Mass.
Assistant Professor of Botany.

SIDNEY B. HASKELL, B.Sc., . . . . . . . 5 Fearing Street.
Assistant Professor of Agronomy.

CLARENCE E. GORDON, A.M., . . . . . . North Amherst, Mass.
Assistant Professor of Zoölogy and Geology.

PERCY L. REYNOLDS, M.D., . . . . . . . 17 Fearing Street.
Assistant Professor of Physical Education and Hygiene.

FLOYD B. JENKS, B.Sc.Agr., . . . . . . North Adams, Mass.
Assistant Professor of Agricultural Education.

ALEXANDER E. CANCE, Ph.D., . . . . . . 9 Fearing Street.
Assistant Professor of Agricultural Economics.

FREDERICK B. MCKAY, A.B., . . . . . . 12 Cottage Street.
Assistant Professor of English and Public Speaking.

ELMER K. EYERLY, A.M., . . . . . . North Amherst, Mass.
Assistant Professor of Political Science and Lecturer in Rural Sociology.

BURTON N. GATES, Ph.D., . . . . . . . 42 Lincoln Avenue.
Assistant Professor of Beekeeping.

GEORGE N. HOLCOMB, A.B., S.T.B., . . . . South Amherst, Mass.
Lecturer in History.

FRANK W. RANE, . . . . . . . . . . Boston, Mass.
Lecturer in Forestry.

RAY L. GRIBBEN,[3] B.Sc.Agr., . . . . . . 66 Pleasant Street.
Instructor in Animal Husbandry.

EDGAR L. ASHLEY, A.M., . . . . . . . Prospect House.
Instructor in German.

ANDERSON A. MACKIMMIE, A.B., . . . . . . Nutting Avenue.
Instructor in French and Spanish, Assistant to the Dean.

C. ROBERT DUNCAN, B.Sc., . . . . . . . 46 Pleasant Street.
Instructor in Mathematics and Physics.

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[1] Beginning with second semester. [2] Beginning April 1, 1911. [3] Resigned Jan. 20, 1911.

Charles R. Green, B.Agr., . . . . . . . . Mount Pleasant.
Librarian.

Charles S. Heller, . . . . . . . . . 1 Allen Street.
Instructor in Market Gardening.

Alvah J. Norman, B.Sc., . . . . . . . . Phillips Street.
Instructor in Pomology.

Charles J. Robinson, B.Sc., . . . . . . . Lincoln Block.
Instructor in Dairying and Animal Husbandry.

John Noyes, B.Sc., . . . . . . . . . Wilder Hall.
Assistant in Landscape Gardening.

W. A. Turner, Ph.B., . . . . . . . . . 34 Amity Street.
Assistant in Chemistry.

Alfred Larsen, B.Sc., . . . . . . . . . —— ——
Assistant in Bacteriology.

Marcus T. Smulyou, . . . . . . . . . —— ——
Graduate Assistant in Botany.

Miss Helena Goessmann, . . . . . . . . Amity Street.
Assistant in English.

## Graduate Assistants.

John N. Summers, B.Sc., . . . . . . . 66 Pleasant Street.
Assistant in Entomology.

Leonard S. McLaine, B.Sc., . . . . . . 84 Pleasant Street.
Assistant in Zoölogy.

## Other College Officers.

Edwin H. Forristall, M.Sc., . . Massachusetts Agricultural College.
Farm Superintendent.

Ralph J. Watts, B.Sc., . . . . . . . . 9 Fearing Street.
Secretary to the President.

Charles H. White, B.Sc., . . . . . . . North Amherst, Mass.
Field Agent.

Newton Wallace, . . . . . . . . . 6 Phillips Street.
Electrician.

Clarence A. Jewett, . . . . . . . . 112 Pleasant Street.
Superintendent of Buildings.

James Whiting, . . . . . . . . . . Hallock Street.
Foreman, Department of Floriculture.

William Chesley, . . . . . . . . . Draper Hall.
Steward, Dining Hall.

Miss Mary E. Caldwell, . . . . . . . . Draper Hall.
Bookkeeper.

Miss Clara L. Stuart,[1] . . . . . . . . . —— ——
Correspondence Clerk.

Miss Henrietta Webster, . . . . . . . . Draper Hall.
Clerk, Treasurer's Office.

Miss Gertrude E. Warner,[2] . . . . . . . . —— ——
Stenographer, Division of Agriculture.

Miss Ruth G. Smith, . . . . . . . North Amherst, Mass.
Clerk to the Dean and Registrar.

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[1] Absent after Feb. 1, 1911.

[2] Resigned December, 1910.

Miss Helen Granger, . . . . . . . . Draper Hall.
Stenographer, Division of Horticulture.
Miss Dorothy Mudge, . . . . . . . North Amherst, Mass.
Clerk, Treasurer's Office.
Miss Mabel R. Case, . . . . . . . . Draper Hall.
Clerk, Division of Short Courses and Extension Work.
Miss Stella H. Webb, . . . . . . . . Draper Hall.
Correspondence Clerk, President's Office.
Miss Lillian M. Gelinas, . . . . . . . Draper Hall.
Clerk, President's Office.
Miss Alice Gilbert, . . . . . . . . Draper Hall.
Stenographer, Division of Agriculture.

## Additional Instructors for the Winter School, 1911.

F. E. Van Horn, Instructor in Butter Making.
J. W. Wellman, Instructor in the Use of Separators.

## Officers of Short Course and Extension Work.

William D. Hurd, M.Agr., . . . . . . 82 Pleasant Street.
Director.
Charles H. White, B.Sc., . . . . . North Amherst, Mass.
Field Agent.
Alvah J. Norman, B.Sc., . . . . . . . Phillips Street.
Horticulture.
Charles J. Robinson, B.Sc., . . . . . . . Lincoln Block.
Dairying and Animal Husbandry.
Miss Mabel R. Case, . . . . . . . . Draper Hall.
Clerk to the Director of Short Courses.

# Officers of the Experiment Station.

William P. Brooks, Ph.D., . . . . . . 28 Northampton Road.
Director.

Joseph B. Lindsey, Ph.D., . . . . . . . 47 Lincoln Avenue.
Vice-Director.

Fred C. Kenney, . . . . . . . . . . Mount Pleasant.
Treasurer.

Charles R. Green, B.Agr., . . . . . . . . Mount Pleasant.
Librarian.

## Department of Plant and Animal Chemistry.

Joseph B. Lindsey, Ph.D., . . . . . . . 47 Lincoln Avenue.
Chemist.

Edward B. Holland, M.Sc., . . . . . 28 North Prospect Street.
Associate Chemist, in charge of Research Division.

Fred W. Morse, Ph.D., . . . . . . . 44 Pleasant Street.
Research Chemist.

Henri D. Haskins, B.Sc., . . . . . . . 87 Pleasant Street.
In charge of Fertilizer Division.

Philip H. Smith, B.Sc., . . . . . . . . 102 Main Street.
In charge of Feed and Dairy Division.

Lewell S. Walker, B.Sc., . . . . . . . 19 Phillips Street.
Assistant.

James C. Reed, B.Sc., . . . . . . . . . Nutting Avenue.
Assistant.

Joseph F. Merrill, B.Sc., . . . . . . North Prospect Street.
Assistant.

Clement L. Perkins, B.Sc., . . . . . 32 North Prospect Street.
Assistant.

Joseph P. Howard, . . . . . . . . North Amherst, Mass.
Collector.

Harry J. Allen, . . . . . . . . . . Amherst, Mass.
Assistant.

James R. Alcock, . . . . . . . . North Amherst, Mass.
Assistant in Animal Nutrition.

## Department of Agriculture.

William P. Brooks, Ph.D., . . . Massachusetts Agricultural College.
Agriculturist.

H. J. Franklin, Ph.D., . . . . . . . . Wareham, Mass.
In charge of Cranberry Investigation.

Erwin S. Fulton, B.Sc., . . . . . . North Amherst, Mass.
First Assistant Agriculturist.
Edwin F. Gaskill, B.Sc., . . . . . . North Amherst, Mass.
Second Assistant Agriculturist.

### Department of Horticulture.

Frank A. Waugh, M.Sc., . . . Massachusetts Agricultural College.
Horticulturist.
Fred C. Sears, M.Sc., . . . . . . . . Mount Pleasant.
Pomologist.
Jacob K. Shaw, M.Sc., . . . . . . . 1 Allen Street.
Assistant Horticulturist.
David W. Anderson, B.Sc., . . . . . 32 North Prospect Street.
Graduate Assistant.

### Department of Botany and Vegetable Pathology.

George E. Stone, Ph.D., . . . . . . . Mount Pleasant.
Botanist and Vegetable Pathologist.
George H. Chapman, M.Sc., . . . . . . 13 Fearing Street.
Assistant Botanist.
Sumner C. Brooks, B.Sc., . . . . . 28 Northampton Road.
Assistant Botanist.

### Department of Entomology.

Henry T. Fernald, Ph.D., . . . . . . . 44 Amity Street.
Entomologist.
Burton N. Gates, Ph.D., . . . . . . 42 Lincoln Avenue.
Apiarist.
Arthur I. Bourne, B.A., . . . . . 66 North Pleasant Street.
Assistant in Entomology.

### Department of Veterinary Science.

James B. Paige, B.Sc., D.V.S., . . . . . 42 Lincoln Avenue.
Veterinarian.

### Department of Meteorlogy.

John E. Ostrander, A.M., C.E., . . . . 35 North Prospect Street.
Meteorologist.
Charles M. Damon, . . . . Massachusetts Agricultural College.
Observer.

### Other Officers of the Experiment Station.

Miss Rose J. Brown, . . . . . . . . Draper Hall.
Secretary to the Director.
Miss Jessie V. Crocker, . . . . . . Sunderland, Mass.
Stenographer, Department of Botany and Vegetable Pathology.

Miss Harriet Cobb, . . . . . . 35 North Pleasant Street.
Stenographer, Department of Plant and Animal Chemistry.
Miss Bridie O'Donnell, . . . . . . . . Hadley, Mass.
Stenographer, Department of Entomology.
Miss Alice M. Howard, . . . . . . . North Amherst, Mass.
Stenographer, Department of Plant and Animal Chemistry.

# COMMITTEES OF THE FACULTY.[1]

## 1910-11.

### SCHOLARSHIP.

The DEAN.
  Professor HASBROUCK.
  Professor WHITE.
  Assistant Professor GORDON.
  Mr. MACKIMMIE.

### SCHEDULE.

Professor OSTRANDER.
  Associate Professor LOCKWOOD.
  Associate Professor NEAL.

### STUDENT ACTIVITIES.

Professor HURD.
  Captain MARTIN.
  Associate Professor LOCKWOOD.
  Assistant Professor EYERLY.
  Assistant Professor McKAY.

### LIBRARY.

Professor STONE.
  Professor BROOKS.
  Professor WELLINGTON.
  Assistant Professor CANCE.

### GRADUATE SCHOOL.

Professor FERNALD.
  Professor WELLINGTON.
  Professor PAIGE.
  Professor STONE.
  Professor SEARS.
  Assistant Professor GORDON.

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[1] The President of the college is ex officio member of these standing committees.

### COMMITTEE ON EMPLOYMENT.

Professor SEARS.
Mr. KENNEY.
Assistant Professor HASKELL.

### ENTRANCE EXAMINATIONS AND ADMISSION.

The REGISTRAR.
Assistant Professor HOWARD.
Assistant Professor OSMUN.
Assistant Professor MCKAY.
Mr. ASHLEY.

### ATHLETICS.

Professor PAIGE.
Assistant Professor REYNOLDS.
Assistant Professor GORDON.

### COURSE OF STUDY.

Professor HART.
Professor WAUGH.
Professor FOORD.
Professor OSTRANDER.
Associate Professor CHAMBERLAIN.

### CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.
Assistant Professor EYERLY.
Assistant Professor CANCE.

### UNCLASSIFIED STUDENTS.

Professor WHITE.
Associate Professor CHAMBERLAIN.
Associate Professor LOCKWOOD.

### COMMENCEMENT.

Professor PAIGE.
Professor WELLINGTON.
Professor WHITE.
Captain MARTIN.
Mr. KENNEY.
Assistant Professor HOWARD.

### ADVISORY COMMITTEE ON DISCIPLINE.

The DEAN.
The TREASURER.
The REGISTRAR.
The COMMANDANT.

# THE COLLEGE.

# ADMISSION.

## A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege on or before June 1 of the year in which examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. If an applicant desires a free State scholarship, he must also present to the registrar a certificate of appointment from the State Senator of his district. Blanks for this purpose also may be obtained of the registrar. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

## B. MODES OF ADMISSSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be met by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.
2. By presenting certificate from any school approved by the college entrance examination boards.
3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present at least three of the six required subjects for admission, and not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.[1]

*Places of Examination.* — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall.

*Schedule for Entrance Examinations, June 21–24, 1911.* — The examinations in June will follow this schedule: —

*First Day.*

| | |
|---|---|
| 1 P.M. | Registration.[2] |
| 1.15–5 P.M. | Latin (A and B). |

*Second Day.*

| | |
|---|---|
| 8 A.M. | Plane geometry. |
| 10 A.M. | Chemistry. |
| 11.30 A.M. | United States history and civics. |
| 2 P.M. | Algebra. |
| 3.30 P.M. | Physics. |
| 4.30 P.M. | Elective English. |

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[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects, applicants may be admitted, upon examination, with a condition in English under these restrictions: (1) The parts of the preparatory study in English will be valued by the examiners approximately as follows in entrance units: (*a*) composition, etc., one and one-quarter units; (*b*) reading and study (including interpretation, three-quarters of a unit; see p. 28), one and three-quarters units; total, 3 units. (2) The applicant to show, upon examination, satisfactory preparation in work amounting to not less than two units.

The purpose of this provision is to avoid the possible injustice of excluding, without further trial, applicants who appear to be deficient in preparation in only one subject; and the examination will be so set as to permit the estimating of separate credits to carry out this purpose.

Attention is called to the standing rule of the uniform entrance requirement bodies concerning English as an admission subject; namely, that applicants whose work is seriously lacking in correct spelling, punctuation, grammar or other elementary essentials of good usage will be rejected.

Students so admitted, must, to remove the condition, pass an examination covering the regular 3-units requirement.

[2] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

*Third Day.*

8 A.M. Required English.
11 A.M. Solid geometry, agriculture.
2 P.M. History, required and elective.
5 P.M. Botany.

*Fourth Day.*

8 A.M. French, German, required and elective.
1 P.M. Greek, and all one-half credit electives, except those already noted.

*Schedule for Entrance Examinations in September.* — In September, 1911, the examinations will be given September 11 to 14, inclusive, and will follow the order indicated for June, beginning September 11 at 1 P.M.

## C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of five recitations a week for a school year. Neither more nor less credit will be given in any subject than is indicated in the table below. Fourteen units must be offered for admission, of which nine are required and five are elective.

(*a*) The following nine units are required: —

| | |
|---|---|
| *Language.* | |
| English, | 3 |
| French or German, | 2 |
| *History and Civics.* | |
| United States history and civics, | ½ |
| History (elective), | 1 |
| (*a*) Ancient history. | |
| (*b*) Medieval and modern history. | |
| (*c*) English history. | |
| (*d*) General history. | |
| *Mathematics.* | |
| Algebra, through progressions, | 1½ |
| Plane geometry, | 1 |

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

*Language.*

| | |
|---|---|
| English in addition to requirements, | 1 |
| French in addition to requirements, | 2 or 1[1] |
| German in addition to requirements, | 2 or 1[1] |
| Greek, | 2 or 3 |
| Latin, | 2 or 3 |
| Latin A, including Cæsar and Cicero, 2; Latin B, including Virgil and Prose Composition, 1. | |

*History.*

| | |
|---|---|
| In addition to requirements, | 1 or 2 |

*Mathematics, and Other Sciences.*

| | |
|---|---|
| Solid geometry, | ½ |
| Trigonometry, | ½ |
| Chemistry, | 1 |
| Physiography, | ½ |
| Physiology, | ½ |
| Agriculture,[2] | ½ or 1 |
| Botany,[2] | ½ or 1 |
| Geology,[2] | ½ |
| Physics,[2] | 1 |
| Zoölogy,[2] | ½ |
| Commercial geography,[3] | ½ |
| Drawing,[3] | ½ |
| Manual training,[3] | ½ or 1 |

**PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 1). Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificate should not present note-books; but their certificate must state that note-books have been satisfactorily completed.**

## D. Statement[4] of Preparation required for Admission.

**In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address substation 84, New York City.**

Agriculture. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade.

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[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] Certification necessary in these subjects; no examinations given.

[4] In alphabetical order by subjects.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

COMMERCIAL GEOGRAPHY. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

DRAWING. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

ENGLISH. — Preparation in English should develop in the candidate (1) ability to express himself well and correctly in his mother tongue, and (2) ability to penetrate through language to the meaning that underlies it.

All candidates for admission — whether by examination or by certification — are urged to secure a thorough training in composition, in which at least part of the subjects written on shall be derived from personal observation, experience and thought. They are urged to cultivate especially, in all their writing, the habit of correctness in spelling, grammar, punctuation, sentence structure and paragraph building. This habit will be of much greater help to them in their work in the college than will mere knowledge of the prescribed books.

In the examination, direct questions may be put, including questions upon grammar. Several compositions, each about one hundred and fifty words long, will be required, including papers to test the candidate's ability to think and write clearly, either on matters involving personal experience or on topics involving knowledge of the books. All candidates received as members of the freshman class are expected to be able — as a result of their study of the books prescribed "For Study and Practice" — to paraphrase or interpret, with some insight, unfamiliar verse or prose of medium difficulty, in which the meaning does not depend on anything outside the passage itself; and, as part of every examination, at least one passage is given for such interpretation.

The list of books for 1911–12 is made up from the list recommended by the Conference on Uniform Entrance Requirements in English. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of June preceding the examinations.

For 1911: —

(*a*) For reading and composition practice: Shakspere's "Merchant of Venice" and "Julius Cæsar;" the "Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography;" Scott's "Ivanhoe;" Hawthorne's "House of the Seven Gables;" Dickens's "A Tale of Two Cities;" Scott's "The Lady of the Lake;" Macaulay's "Lays of Ancient Rome;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur."

(*b*) For detailed study and practice: Shakspere's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America," or Washington's

"Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

For 1912: —

(*a*) For reading and composition practice: Shakspere's "As You Like It" and "Julius Cæsar;" Franklin's "Autobiography;" Goldsmith's "The Deserted Village;" Dickens's "A Tale of Two Cities;" George Eliot's "Silas Marner;" Irving's "Sketch Book;" Scott's "The Lady of the Lake;" Byron's "Mazeppa" and "The Prisoner of Chillon;" and Macaulay's "Lays of Ancient Rome."

(*b*) For thorough study and practice: Shakspere's "Macbeth;" Milton's "Comus," "L'Allegro" and "Il Penseroso," or Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

For 1913, 1914, 1915: —

*English Grammar and Composition.* — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

*Literature.* — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

*Examination.*[1] — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

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[1] Read in connection with this statement the first three paragraphs under "English," pp. 27, 28.

The second part of the examination will include composition and those books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects, perhaps five or six, from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

ENGLISH, ELECTIVE. — To secure a fourth entrance credit in English, the applicant should do (*a*) the equivalent of three years' work, five periods weekly (required English), and also (*b*) the equivalent of a fourth year's work, five periods weekly. Applicants not certified with a fourth entrance credit will be examined. In order, however, that examination questions may be prepared, the applicant for examination should notify the Department of English by the first of June preceding the examinations, stating which English subject or subjects he wishes to present.

*Subjects accepted.* — The applicant may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.

(*b*) History of English literature (or lives of the great authors).

(*c*) Classics other than those read to meet the three-credit requirement, the applicant to present a complete list of his readings. The reading for the fourth credit should be of the same detailed, careful kind as is given the books prescribed for "Reading and Practice" in the official list of entrance requirement readings.

(*d*) Advanced composition.

(*e*) History of the English language.

(*f*) Advanced high school grammar.

*Advanced Standing in College.* — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board.

*Presentation of Note-books and Themes.* — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

FRENCH. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, when required units have been offered in French, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.[1]

GEOLOGY. — Grouped with zoölogy, which see.

GERMAN. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).[1]

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, when required units have been offered in German, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

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[1] If the two required and two elective modern language units are offered in French and German, the work known as "Elementary" may be offered in both cases.

GREEK. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first two books of Xenophon's "Anabasis;" and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from the first book of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the forms and constructions of the passages.

HISTORY. — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," books I. to IV., or an

equivalent, and from Cicero's "Orations against Catiline;" and (*b*) the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from books I. and II. of Virgil's "Æneid;" and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

## E. Admission to Advanced Standing.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

## F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted. For a special provision permitting entrance with a condition in English, see footnote, p. 24.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.
5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.
6. Examinations in part of the subjects required for entrance may be taken one year before entering college.
7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

9. All requests for information concerning admission of unclassified students should be addressed to Prof. E. A. White, chairman of committee on unclassified students.

### G. Unclassified Students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

# COURSES OF INSTRUCTION.

## A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

### FRESHMAN YEAR.

#### *First Semester.*

[All work required.]

| | |
|---|---|
| English, | 4 |
| French or German,[1] | 4 |
| Algebra, | 5 |
| Chemistry, | 3 |
| Hygiene, | 1 |
| Physical education,[2] | 2 |
| Public speaking (at option of instructor), | 1 |
| College life (attendance required without credit). | |
| | 19 or 20 |

#### *Second Semester.*

[All work required.]

| | |
|---|---|
| English, | 4 |
| French or German, | 4 |
| Geometry and trigonometry, | 5 |
| Chemistry, | 3 |
| Elementary agriculture, | 2 |
| Physical education, | 2 |
| Public speaking (if not taken in semester 1), | 1 |
| | 20 or 21 |

### SOPHOMORE YEAR.

#### *First Semester.*

[All work required.]

| | |
|---|---|
| English, | 2 |
| French or German, | 3 |
| Agronomy, | 3 |
| Zoölogy, | 3 |
| Physics, | 5 |
| Physical education, | 2 |
| | 18 |

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[1] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

[2] Physical education includes military training.

### *Second Semester.*

[All courses under "Required," with any two of those under "Elective."]

[Required.]

| | |
|---|---|
| English, | 2 |
| Elementary horticulture, | 2 |
| Botany, | 4 |
| Agricultural industry, | 3 |
| Physical education, | 2 |
| | 13 |

[Elective.]

| | | |
|---|---|---|
| French or German, | each 3 hours. Any two, | 6 |
| Animal husbandry, | | |
| Geology, | | |
| Physics, | | |
| Chemistry, | | |
| Surveying, | | |
| | | 19 or 18 |

### JUNIOR AND SENIOR YEARS.

In the junior and in the senior year, work must be taken each semester amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

| | |
|---|---|
| Physical education, two credits each semester of junior year, | 4 |
| Political science (Course 1, Economics), | 3 |
| English (any of the elective courses except Literature 15 and 16), | 3 |

[Elective.]

Unless otherwise stated, elective courses are open to both juniors and seniors. Elections are subject to such provisions as either the faculty or the instructors in the courses may declare. In electing courses, students will prepare the statement of their elections strictly in this form:—

For semester one two of 1910–11, I elect these courses, namely: —

| No. of Course in Catalogue. | Name of Course in Catalogue. |
|---|---|
| | |

(Signed) ______________________

Class of 191___.

[Only those courses are here mentioned which are entirely elective; some courses that are open to election by part of the students but are required courses for others are omitted. For such courses, see under the respective department headings the descriptions of "Required Courses."]

- Agricultural education, 1, 2, 3, 4, 5, 6.
- Agriculture: —
  - Agriculture, 3.
  - Agronomy, 3, 4, 6, 8.
  - Animal husbandry, 2, 3, 4, 5, 6.
  - Dairying, 1, 2, 3, 4.
  - Farm administration, 3, 4.
- Botany, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14.
- Chemistry, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 17, 18, 19.
- Entomology, 2, 3, 4.
- Horticulture: —
  - Horticulture, 3, 4, 6.
  - Pomology, 1, 2, 3, 4.
  - Floriculture, 1, 2, 3, 4.
  - Landscape gardening, 1, 2, 3, 4, 5, 6, 7, 8.
  - Forestry, 1, 2.
  - Market gardening, 2, 3.
  - Drawing, 1, 2.
- Humanities: —
  - English: —
    - English language and journalism, 9, 10, 15, 16, 17.
    - Literature, 9, 10, 13, 14, 15, 16, 18.
    - Public speaking, 8, 9, 10.
  - Modern European languages: —
    - French, 6, 7, 8.
    - Spanish, 1, 2.
    - German, 6, 7, 8.
  - Music, 1, 2.
  - Political science, 2, 3, 4, 5, 6, 8.
- Mathematics, 7, 10; Physics, 6, 9, 15; Engineering, 8, 11, 12, 13, 14.
- Military science, 11, 12.
- Physical education, 7, 8, 9, 10.
- Rural social science: —
  - Agricultural economics, 4, 5, 6, 7, 9, 10.
  - Rural sociology, 12, 16.
- Veterinary science, 1, 3, 4.
- Zoölogy and geology: —
  - Zoölogy, 3, 4, 5, 6, 7, 8, 9.
  - Geology, 2.

## B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. Under the heading "Required Courses" are classified all courses that are specifically required of any group of students, although in some cases the same courses are open to other students as electives. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 9, page 9 of the Rules. Announcements of courses that are not given in 1910–11 are inclosed in brackets.]

### *Department of Agricultural Education.*

Professor HART and Assistant Professor JENKS.

#### *Elective Courses.*

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. METHODS. — A study of mental growth; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2. Professor HART.

4. TEACHERS' AGRICULTURE. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical sciences as are adapted to the work of the public schools; planning, and practical work in school gardens; decoration of school grounds;

equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3.

Professor HART and Assistant Professor JENKS.

5. SEMINAR IN EDUCATION. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: legislation and agricultural education, the place and value of agricultural science in school courses, etc. Seniors and graduate students; 2 hours. Credit, 2.

Professor HART.

6. SEMINAR IN EDUCATION. — As stated under Course 5.

Professor HART.

## DIVISION OF AGRICULTURE.

Professor FOORD, Dr. BROOKS, Associate Professor LOCKWOOD, Associate Professor McLEAN,[1] Assistant Professor HASKELL, Mr. GRIBBEN,[2] Mr. ROBINSON.

### *Sections.*

AGRICULTURE.
AGRONOMY.
ANIMAL HUSBANDRY.
DAIRYING.
FARM ADMINISTRATION.

### *Agriculture.*

#### *Required Courses.*

2. ELEMENTARY AGRICULTURE. — A brief course touching upon the application of science to the common things of the farm. The work of the agricultural experiment stations and its relation to farm practice will be considered. Lectures, text-book and laboratory. Freshmen; 1 laboratory and 1 lecture period. Credit, 2.

#### *Elective Courses.*

3. AGRICULTURAL SEMINAR. — A brief survey of current agricultural literature, open to juniors and seniors electing work in the Division of Agriculture. Topics will be assigned and reports required. One hour. Credit, 1. Professor FOORD.

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[1] Beginning with second semester.

[2] Up to Jan. 20, 1911.

## *Agronomy.*

### *Required Courses.*

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 lecture hours. Credit, 3.
Assistant Professor Haskell.

### *Elective Courses.*

3. Field and Forage Crops. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Assistant Professor Haskell.

4. Field Crop Improvement. — A study of the influences determining the yield and value of field crops, and of methods of selecting seed and plant with reference to crop improvement. Particular attention is given to the breeding of plants for early maturity, hardiness and disease resistance, so as to fit them to New England conditions. Lectures, laboratory and field work. Prerequisite, Agronomy 3; 1 lecture and 1 laboratory period. Credit 2.
Assistant Professor Haskell.

6. Advanced Soils. — Theoretical and practical work on irrigation and drainage; soil survey, with the view of observing the relation between types of soil and natural vegetation; soil mapping. Lectures, laboratory and library work; 1 lecture and 2 laboratory periods. Prerequisites, Agronomy 1 and Mathematics 8. Credit, 3. Assistant Professor Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers.

and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. BROOKS.

### *Animal Husbandry.*

#### *Elective Courses.*

2. TYPES AND BREEDS OF FARM ANIMALS. — A general introductory course. The development, characteristics and adaptability of the more common breeds of farm live stock. Lectures; Plumb's "Types and Breeds of Farm Animals." Sophomores; 2 lecture periods and 1 laboratory period. Credit, 3.
Associate Professor McLEAN.

3. PRINCIPLES OF LIVE STOCK IMPROVEMENT. — A careful study of the principles of inheritance, and a discussion of methods of improving herds or individual animals, of crossing and grading in the production of market and farm stock. Prerequisite, Course 2; 3 lecture periods; library references. Credit, 3.
Mr. GRIBBEN, [Associate Professor McLEAN.]

4. DAIRY CATTLE. — Score cards as applied to breed type and their use in scoring for advanced registry; herd book study. One object is to acquaint the student with the various families of the different breeds, their producing powers and external characteristics. The men who will represent the college in judging contests will be chosen from those electing this course, according to the merit of their work. Text-book, lectures and laboratory work; text-book, Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2. Associate Professor McLEAN.

5. HORSES, SHEEP AND SWINE. — A course similar to Course 4, but dealing with different classes of stock. Of necessity, the study cannot be so detailed as that made in the preceding course, yet a good working knowledge of the judging of these classes is aimed at.

The course will consist largely of judging practice, with some periods devoted to lectures, covering such topics as unsoundness in horses and the determination of age in domestic animals. Text-book, lectures and laboratory work. Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2.
Mr. GRIBBEN, [Associate Professor McLEAN.]

6. FEEDING AND MANAGEMENT OF FARM LIVE STOCK. — The principles of nutrition; their relation to stock feeding; the balanced ration; feeding standards; feed stuffs, method of manufacture, economy to the feeder; economical feeding and management of farm animals; feeding for special purposes (as of dairy cows for records and in preparation for public sales or exhibitions). Text-books and lectures; text-books, Henry's "Feeds and Feeding" and Jordan's "Feeding Farm Animals;" experiment station bulletins. Students electing this course are advised to present Chemistry 5 and 6 and register in veterinary science; 3 hours. Credit, 3.
Associate Professor McLEAN.

### *Dairying.*

#### *Elective Courses.*

1. MILK AND ITS COMPOSITION. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 3; 2 lecture hours and 1 laboratory period. Credit, 3.
Associate Professor LOCKWOOD.

2. MARKET MILK. — A study of the market milk conditions, extent and development of the business, supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection; a study of bacteriology relative to milk and dairy work. Must be preceded or accompanied by Animal Husbandry 4. Prerequisite, Course 1; 2 lecture hours and 1 laboratory period. Credit, 3. Associate Professor LOCKWOOD.

3. Butter Making. — A study of hand and factory separators, separator construction and cream separation; handling milk and cream for butter making on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy-building construction; plans for dairy buildings, arrangement, ventilation, light, sanitation; dairy machinery and care thereof; practical mechanics as applied to the creamery; cement construction as related to dairy construction work. Prerequisites, Courses 1 and 2; 2 lecture hours and 1 laboratory period. Credit, 3.
Associate Professor Lockwood.

4. Manufactured Milk Products. — Manufacture of other dairy products than butter. Cheddar and fancy cheeses; condensed milks; whey butter, cottage cheese, ice cream, casein, milk powder, etc.; dairying in other countries; library work. Must be preceded or accompanied by Animal Husbandry 6. Prerequisites, Courses 1, 2 and 3; 2 lecture hours and 1 laboratory period. Credit, 3.
Associate Professor Lockwood.

### *Farm Administration.*

#### *Elective Courses.*

3. Farm Equipment. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Agronomy 1, Animal Husbandry 2 and Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3. Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3. Professor Foord.

## *Department of Botany.*

Professor STONE, Assistant Professor OSMUN.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

### *Required Courses.*

2. HISTOLOGY, PHYSIOLOGY, MORPHOLOGY AND CLASSIFICATION OF PLANTS. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analysis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4. Assistant Professor OSMUN.

### *Elective Courses.*[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough

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[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.
Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; 1 two-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; 1 two-hour laboratory and 1 one-hour lecture period. Credit, 2.
Professor STONE and Assistant Professor OSMUN.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; 3 three-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; 2 or 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4 or 5.
Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9. Professor STONE.

11. PLANT PHYSIOLOGY. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 5.
Professor STONE.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11. Professor STONE.

13. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; 2 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4.
Professor STONE.

14. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — As stated in Course 13. Prerequisite, Course 13. Professor STONE.

## *Department of General and Agricultural Chemistry.*

**Professor WELLINGTON, Associate Professor CHAMBERLAIN, Assistant Professor HOWARD.**

[The courses in chemistry aim to teach accurate observation, logical thinking and systematic and constant industry, together with a comprehensive knowledge of the subjects presented. Instruction is given through text-books, lectures and a large amount of laboratory work under supervision. The laboratory work at first consists of the study of the properties of elementary matter, the analysis of simple combinations, and their artificial preparation. This is followed by the quantitative analysis of salts, minerals, soils, fertilizers, and the chemistry of various manufacturing industries, especially those of agricultural interest, such as are concerned in the production of sugar, starch and dairy products; the preparation of animal and plant foods, their digestion, assimilation and economic use; and the official analysis of soils, insecticides, fungicides, waters, milk, wine, and other animal and vegetable products.]

### *Required Courses.*

1. THE NON-METALS. — An introduction to chemical laws. The commoner non-metallic elements, their occurrence in nature, and their uses in the arts, are studied. Lectures and laboratory exercises. Freshmen; 4 hours. Credit, 3.
Assistant Professor HOWARD.

2. THE COMMON METALS. — This course extends the study of Course 1 to the metals common in the arts, and includes blowpipe analysis and elementary determinative mineralogy. Lectures, recitations and laboratory exercises. Prerequisite, Course 1. Freshmen; 4 hours. Credit, 3.

Assistant Professor HOWARD.

*Elective Courses.*

3. GENERAL CHEMISTRY. — This course makes a more thorough study of the physical laws and typical reactions than is made in Courses 1 and 2. For all students intending to specialize in chemistry this course is required. Prerequisite, Course 2. Lectures, 1 hour; laboratory, 4 hours. Credit 3.

Assistant Professor HOWARD.

4. QUALITATIVE ANALYSIS. — A course in the systematic analysis of the important metals and acids and their salts. Students electing advanced courses in chemistry should take this course. Lectures and laboratory work; Medicus's "Qualitative Analysis." Prerequisite, Course 2. Sophomores; 6 hours. Credit, 3.

Assistant Professor HOWARD.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry; and forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for possible future work in agricultural chemical investigation. Prerequisites, Courses 1, 2 and 4. Those electing Course 5 are expected to elect Course 6. Juniors; lectures, 3 hours; laboratory, 4 hours. Credit, 5.

Associate Professor CHAMBERLAIN.

6. — As stated under Course 5.

Associate Professor CHAMBERLAIN.

7. Agricultural Chemistry. — A course continuing through the two semesters of the junior year. This course and Course 8 are designed as an alternative for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but who are planning to enter practical agricultural work and desire a somewhat further knowledge of chemistry as it is related directly to agriculture and agricultural problems. The work is planned in two parts, viz., *Course 7, Inorganic Agricultural Chemistry,* the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the common materials of construction, such as tile, brick, cements, paints, oils, etc.; and *Course 8, Organic Agricultural Chemistry,* the study of plants and animals as to composition, nutritive value and general processes of nutrition and growth, and also the study of products manufactured from them, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspect of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8; lectures, 3 hours. Credit, 3.

Associate Professor Chamberlain.

8. — As stated under Course 7.

Associate Professor Chamberlain.

9. Quantitative Analysis. — A course continuing through the two semesters of the junior year; for those who wish to acquire skill in chemical analysis. Students intending to enter experiment station or chemical-control work have here an opportunity to become familiar with the reactions and processes concerned. Prerequisite, Course 4. Juniors; those electing Course 9 are expected to elect Course 10; lectures, 1 hour; laboratory, 9 hours. Credit, 5.

Professor Wellington.

10. — As stated under Course 9.

Professor Wellington.

13. Physiological Chemistry, Vegetable. — This course and Course 14 are intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific

work, and who have had Courses 5 and 6, Course 13 will give acquaintance with the chemistry of the physiological processes in plants, and the action of physiological substances. Together with Course 14, it gives additional training in the chemical problems of agricultural experiment station work, and it will, with the courses in analytical chemistry, fit men for such work. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give additional knowledge of the facts and processes with which they will meet. It will consider more exactly and in greater detail the chemical and physiological aspect of problems which were treated generally in Courses 7 and 8. Prerequisites, Courses 5 and 6, or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN.

14. PHYSIOLOGICAL CHEMISTRY, ANIMAL. — A continuation, or counterpart, of Course 13, but dealing with animals. Prerequisites, Courses 5 and 6, or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3. Associate Professor CHAMBERLAIN.

15. CHEMICAL PROBLEMS. — A course in the historical progress of agricultural chemistry. The inception and growth of modern knowledge in agricultural chemistry will be intimately studied for the purpose of familiarizing the student with the experimental work and the logical processes of the more notable achievements in this department of chemistry. The course includes work in the biography and literature of research, as well as general chemical history. The classic works of Liebig, Wöhler, Liebermann, Baeyer, Gilbert, Henneberg, Tollens, Fischer and others will be taken up. In the light of the studies made, present-day problems in agricultural chemistry will be examined and methods for their solution tried. Prerequisites, Courses 5 and 6, 9 and 10, 11, 13, 14. Open to students only by permission; lectures, reading and laboratory work; 1 lecture and 4 laboratory periods. Credit, 5.

Professor WELLINGTON.

17. CHEMICAL PRACTICE IN AGRICULTURE. — This course and Course 18 are divided into subcourses as follows: —

*A. Analysis of Fertilizers, Insecticides and Fungicides.* — The theory, with a large amount of practice in this subject, is given under the close supervision of a teacher. The methods followed are in the first place comparative. Then the preferred official methods are intimately studied, especially with reference to their limitations. The students are impressed with the fact that, even at this late day, all of these methods require revision, and are only awaiting the clear head of the learned man and the expert technician for their improvement. Prerequisite, Course 4. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

*B. Analysis of Foods and Fodders.* — This course is pursued in a method uniform with that of Course 17*A*. Both courses are intended to fit men for experimental station and control work, as well as for research efficiency. The latest results of alimentation, physiology and the composition of foods and condiments are studied. The students will be urged to make inquiry for themselves in the fields of study. Prerequisites, Courses 5 and 6, 9 and 10, 13; corequisite, Course 14; lecture 1 hour, laboratory 9 hours. Credit, 5.

*C. Chemistry of Sugar Making and Refining.* — In this course, after the chemical character of sugar and its function as a food have been determined, the theory and practice of the subjects named will be intimately studied. This involves practice in the analysis of many common chemicals, minerals and manufactured products, such as limestone, coal, boneblack, sulphites, clays, etc. The behavior of sugars and allied substances toward light, qualitatively and quantitatively, is investigated. The students are fitted for service in sugar houses and sugar refineries. Prerequisite, Courses 5 and 6; lectures 1 hour, laboratory 9 hours. Credit, 5.

*D. Dairy Chemistry.* — This course takes up instruction in the various processes of dairy chemistry, including chiefly the analysis of foods for dairy animals and the dairy products. Given in alternate years; given in 1910–11. Open only on permission; lectures 1 hour, laboratory 6 hours. Credit, 3. Professor WELLINGTON.

18. CHEMICAL PRACTICE IN AGRICULTURE. — As stated under Course 17. Professor WELLINGTON.

19. SANITARY CHEMISTRY. — This course is planned to bring into striking and intimate relationships many hitherto missing facts between the science of the lecture room and laboratory and the actual practice of living as it is pursued in every condition in which a person finds himself between birth and death. It is hoped that this course will impart to every one who takes it new conceptions of the functions and duties of practical life. It is believed that,

through carefully and minutely demonstrated experiments, this end will be attained. Given in alternate years; not given in 1910–11. Open only on permission; lectures 2 hours. Credit, 2.
Professor WELLINGTON.

## *Department of Entomology.*

Professor FERNALD, Mr. SUMMERS.

[A knowledge of insects is of importance in every department of life, and particularly in connection with agriculture, horticulture, biology, landscape gardening and forestry; it therefore forms part of a general education. An introductory course in this subject is accordingly offered in the junior year. For those who desire a further knowledge of the subject, because of its importance to their future occupation, a senior course is also offered, so arranged as to be of especial value for those who expect to take up agriculture, horticulture, landscape gardening, forestry or science teaching.]

### *Elective Courses.*

2. GENERAL AND ECONOMIC ENTOMOLOGY. — This course comprises studies in the structure of insects as applied to their identification, and in the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collection and in the field, and methods for their control. The most important insecticides, and their preparation and application with different kinds of apparatus are also treated. Field work in collecting insects is a part of the course; and this is accompanied by laboratory work on methods of pinning, pressing and mounting insects, and of classifying them. Juniors; 4 one-hour lecture periods till about May 1; thereafter 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4. Professor FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

*A. Morphology.* — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

*B. Histology.* — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

*C. Insecticides and Apparatus.* — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects, tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work on adulterated materials.

*D. Coccidology.* — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

*E. Bibliography.* — Studies of the various entomological publications and of the methods of finding the literature on any insect.

*F. Special Studies.* — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the structure, life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4.

Professor FERNALD and Mr. SUMMERS.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3. Professor FERNALD and Mr. SUMMERS.

## DIVISION OF HORTICULTURE.

Professor WAUGH, Professor SEARS, Professor WHITE, Associate Professor MOON, Mr. HELLER, Mr. NOYES, Mr. NORMAN, Mr. RANE.

### *Departments.*

HORTICULTURE.
POMOLOGY.
FLORICULTURE.
LANDSCAPE GARDENING.
FORESTRY.
MARKET GARDENING (SECTION).
DRAWING (SECTION).

## *Department of Horticulture.*

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of horticulture.]

### *Required Courses.*

2. Nursery Practice. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Mr. Norman.

### *Elective Courses.*

3. Plant Materials. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3. Professor White.

4. Plant Materials. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3; 2 lecture periods and 1 free afternoon. Credit, 3. Professor White.

6. Plant Breeding. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 two-hour laboratory period. [Not given in 1910–11.] Credit, 3.

## *Department of Pomology.*

### *Elective Courses.*

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3. Professor Sears.

4. Commercial Pomology. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3. Professor Sears.

## *Department of Floriculture.*

### *Elective Courses.*

1. Greenhouse Management. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing concrete, bench construction, bulb culture, greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants

by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4.
Professor WHITE.

2. GREENHOUSE DESIGN AND CONSTRUCTION. — A continuation of Course 1, including also a study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisite. Floriculture 1; 7 hours. Credit, 4. Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbacious perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Professor WHITE.

## *Department of Landscape Gardening.*

### *Elective Courses.*

1. ELEMENTS OF LANDSCAPE GARDENING. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected works of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 7 hours a week. Credit, 4. Mr. NOYES.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.
Professor Waugh and Mr. Noyes.

3. General Landscape Gardening. — Field notes; examination of completed works and those under construction; design of architectural details; planting plans; estimates; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 7 hours. Credit, 4.
Professor Waugh and Mr. Noyes.

4. General Landscape Gardening. — As stated under Course 3. Prerequisite, Course 3.
Professor Waugh and Mr. Noyes.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.
Professor Waugh.

6. Architecture. — A course giving the history of architectural development, the different historic types, with special reference to the underlying principles of design and construction and to the applications in landscape architecture. Lectures, illustrated with stereopticon and plates; conferences; practice in design; 2 hours. Credit, 2.
Mr. Noyes.

7. Civic Art. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Text-book, Robinson's "Modern Civic Art." Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3.
Professor Waugh.

8. Civic Art. — As stated under Course 7. Prerequisite, Course 7.
Professor Waugh.

## *Department of Forestry.*

### *Elective Courses.*

1. Dendrology and Silviculture. — These two subjects run parallel throughout the year. Under dendrology, the habits and needs of trees are studied, their distribution, soil and moisture requirements, growth, etc. Under silviculture are taken up the life history of trees and stands; tree characteristics, how modified; the concept of a forest and its subdivisions; methods of reproduction, both natural and artificial, with both theoretical and practical work in thinnings and nursery practice. Juniors; 3 lectures weekly, with 4 additional hours of optional field work. Credit, 3. Associate Professor Moon.

2. Dendrology and Silviculture. — As stated under Course 1. Prerequisite, Forestry 1. Associate Professor Moon.

## *Market Gardening.*

### *Elective Courses.*

2. Elements of Market Gardening. — A study of market gardening as a business, with detailed consideration of the conditions under which it is practiced. The problems of soil selection and soil management, garden fertilization and tillage, receive attention from the viewpoint of the market gardener, and considerable time is devoted to the study of garden crops. Juniors; prerequisite, Horticulture 2; 3 hours. Credit, 3. Mr. Heller.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Floriculture 2 must be taken in connection with this course. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3. Mr. Heller.

## *Drawing.*

### *Elective Courses.*

1. Freehand Drawing. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color

rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. (Was not given in 1909–10.) Juniors; 6 hours. Credit, 3. Mr. NOYES.

2. MECHANICAL DRAWING. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. NOYES.

## DIVISION OF THE HUMANITIES.

Professor MILLS,[1] Associate Professor NEAL, Assistant Professor EYERLY, Assistant Professor McKAY, Mr. HOLCOMB, Mr. MACKIMMIE, Mr. ASHLEY, Mr. GREEN, Miss GOESSMANN.

### *Departments.*

ENGLISH.
MODERN EUROPEAN LANGUAGES.
MUSIC (SECTION).
POLITICAL SCIENCE.
LIBRARY.

### *Department of English.*

ENGLISH LANGUAGE; JOURNALISM.
LITERATURE.
PUBLIC SPEAKING.

### ENGLISH LANGUAGE.

#### *Required Courses.*

1. FRESHMAN ENGLISH.—Composition; introduction to literature. Recitations and lectures; theme writing; conferences.[2] Freshmen; 4 hours. Credit, 4.

Associate Professor NEAL and Assistant Professor McKAY.

2. FRESHMAN ENGLISH. — As stated under Course 1. Prerequisite, Course 1; 4 hours. Credit, 4.

Associate Professor NEAL and Assistant Professor McKAY.

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[1] Absent on leave.

[2] Student assistants (in charge of freshman groups for tutoring in spelling, punctuation and similar elementary matters; theme readers). Class of 1911: Herbert Jonathan Baker (second year); Edgar Morton Brown (second year, semester one); Leonard Matthews Johnson (second year); Bernard Ostrolenk (second year). Class of 1912: Royal Norton Hallowell (semester one), Marshall Cotting Pratt, Lawrence Peck Rockwood, Lewis Raymond Sellew (second semester).

3. SOPHOMORE ENGLISH.[1] — Composition; literature. Prerequisite, Course 2; sophomores; 2 hours. Credit, 2.
Associate Professor NEAL.

4. SOPHOMORE ENGLISH.[1] — As stated under Course 3. Prerequisite, Course 3.
Assistant Professor McKAY and Miss GOESSMANN.

7. TRAINING COURSE. — A course (*a*) required of student assistants in English, and (*b*) open (with the instructor's consent) to candidates for a tutorship. Candidates are expected to take it in qualifying for appointment. The course may be taken for either sophomore or elective credit. Two hours. Credit, 2.
Associate Professor NEAL.

8. TRAINING COURSE. — As outlined under Course 7.
Associate Professor NEAL.

*A. Use of Library.* — Lectures on the use of the Library. Hours to be appointed. Required of all sophomores in the first semester as part of Course 3. Mr. GREEN.

[Enrolment in the elective courses in the Department of English is subject to the approval of the instructor. The membership in several of the courses is strictly limited; hence students are advised to plan their work well in advance in order to be sure of completing the required three hours of post-sophomore English. This credit must be made up without taking Literature 15 or 16.]

### ENGLISH LANGUAGE AND JOURNALISM.

#### *Elective Courses.*

9. JOURNALISM.[2] — Under the title "Journalism" are grouped agricultural journalism, newspaper and periodical writing and a somewhat more advanced study of journals and journalistic writing. All these courses are closely related. In the beginning, the course in agricultural journalism and that in periodical writing are identical; the introductory work in periodical writing — such

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[1] Students whose work in Courses 1 and 2 reaches a standard satisfactory to the Department may be excused from not more than half of the sophomore work in English. At present, students in Course 3 or Course 4 are permitted, under restrictions to be stated by the Department, to substitute Public Speaking for English Language and Literature.

[2] The attention of students who elect courses in Journalism is specially directed to the courses given in the collateral subjects here mentioned: Agricultural Education, especially Courses 1 (Psychology) and 2; French; German; Spanish; Political Science; Rural Social Science; English Language and Literature; Public Speaking. By judicious election among the scientific courses and among courses in the subjects named above, a student wishing to follow either agricultural or general journalism can broadly and effectively prepare himself for the profession.

as desk editing, proof reading, and especially the writing of news stories in simple reporting style — being deemed necessary as training preparatory to any kind of journalistic work. The chief differences between the courses are, (1) that Course 9*A* (agricultural) opens more immediate opportunities for practical work, as publication for a limited amount of the student writing is found in agricultural periodicals; and (2) that Course 9*B* (periodical) opens the way for more varied observation and investigation, and for more varied experience in writing, contributing in these ways to general culture, as Course 9*A* contributes to specialized training. In addition, the course in periodical writing has in mind the increasing importance of rural journalism as an influence and occupation in the developed rural community.

*A. Agricultural Journalism.* — The production of "copy" adapted to the use of agricultural periodicals. The class, organized as an editorial staff, is charged with the preparation of an agricultural periodical. Two hours. Credit, 2.

*B. Newspaper and Periodical Writing.* — The elements of journalism — newspaper and magazine writing, reporting, editing, printing, etc. The class, organized as an editorial staff, is to issue a periodical. It is responsible for "covering" events, desk editing, copy and proof reading, making "dummies" and writing legends for illustrations, completing "forms" and "publishing" the periodical upon schedule time, etc. The first semester will be devoted principally to newspaper writing; the second semester to periodical writing. Two hours. Credit, 2.

[*C. Proseminar in Journalism.* — Informal, beginning with a study by individual students of editorial writing and of types of magazine writing, such as "descriptive" articles, research articles, "human interest" articles, and articles in "popularized" science. Members of the class are expected to formulate through these studies theories of journalism and journalistic writing, to state them in thesis form, and to produce articles of the kinds studied. Reference reading and reports upon current periodicals may be called for. Given only by special arrangement. One hour. Credit, 1.]

9*A* and 9*B* may be taken at the same time.

Associate Professor NEAL.

10. JOURNALISM. — As stated under Course 9.

Associate Professor NEAL.

15. ENGLISH LANGUAGE. — See Literature 15.

16. ENGLISH LANGUAGE. — See Literature 16.

[17. ADVANCED COMPOSITION. — A course varying in plan, but usually concerned with some form of exposition, description or narration. Not given in 1910–11. Two hours. Credit, 2.
Associate Professor NEAL.]

### LITERATURE.

#### *Required Courses.*

1, 2, 3, 4, 7 and 8. — See the courses so numbered under "English Language."

#### *Elective Courses.*

9. CULTURAL READING.[1] — Individual reading courses intended to encourage broader acquaintance with (*a*) literature, (*b*) art, (*c*) philosophy (including psychology), or (*d*) history (including political and social science). The reading must be sufficient to require forty-five hours; must be entirely non-technical; may be in any of the subjects indicated above; must not consist in research; and may — subject strictly to its purpose — be taken in any department by arrangement between the student and the instructor in the department concerned. If the reading be taken outside the Department of English, the student must present in writing the consent of the instructor under whom he wishes to read. Each student must present a two-thousand-word paper and a notebook. Prerequisite, the sophomore courses in English; total credits allowed to one student for cultural reading work, 2. Credit, 1.
Associate Professor NEAL.

10. CULTURAL READING. — As stated under Course 9.
Associate Professor NEAL.

13. LITERARY HISTORY. — A course dealing with literary periods or with authors; in 1910–11, Elizabethan literature. Lectures, text-book and reference assignments, and class-room interpretation of authors; much outside reading; written studies upon

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[1] Courses in semester one include: Poe, Kipling, Stevenson, English fiction in the nineteenth Century, Carlyle, American prose, Wordsworth, Tennyson, psychology, evolution; and, outside the Department of English, biography of great chemists, political science, and landscape art.

announcement. Given upon application. Prerequisite, the sophomore courses in English. Two hours. Credit, 2.
Associate Professor NEAL.

14. LITERARY HISTORY. — As outlined under Course 13. In 1910–11, Tennyson. Associate Professor NEAL.

[15. ENGLISH LANGUAGE AND LITERATURE. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Not given in 1910–11. Seniors; 3 hours. Credit, 3.
Professor MILLS.]

[16. ENGLISH LANGUAGE AND LITERATURE. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Not given in 1910–11. Seniors; 3 hours. Credit, 3.
Professor MILLS.]

18. ADVANCED LITERATURE. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristic of literary types; in 1910–11, the English novel. Open only upon arrangement. Tests and examinations. Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor NEAL.

## PUBLIC SPEAKING.

### *Required Courses.*

1. FRESHMAN PUBLIC SPEAKING. — Freshman public speaking is required in either the first or the second semester, at the option of the instructor. Voice exercises; practice in the delivery of declamations and interpretive readings. Freshmen; 1 hour. Credit, 1. Assistant Professor McKAY.

2. FRESHMAN PUBLIC SPEAKING. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1.
Assistant Professor McKAY.

3. SOPHOMORE PUBLIC SPEAKING. — Original speeches on assigned topics and declamations, supplemented by exercises in voice development and gesture. Elective within the English Depart-

ment, as stated under English Language 3. Prerequisite, Course 1 or 2, or its equivalent. Sophomores; 1 hour. Credit, 1.

Assistant Professor McKay.

4. Sophomore Public Speaking. — Work of the same character as in Course 3, but more advanced. This course offers practice in the making of longer original speeches, in declamation, debating and dramatic reading. Elective within the English Department, as stated under English Language 3. Prerequisite, Course 3. Sophomores; 1 hour. Credit, 1.

Assistant Professor McKay.

### *Elective Courses.*

8. Oratory. — Speeches on assigned topics; prescribed reading; the preparation and delivery of an oration, supplemented by a study of the principles of oratorical composition and delivery. It is especially recommended for those who desire to enter the Flint contest. Prerequisite, Course 3; 1 hour. Credit, 1.

Assistant Professor McKay.

9. Debating. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2.

Assistant Professor McKay.

10. Dramatic Reading. — Exercises for voice and gesture; a study of the elements of vocal expression and action; expressional reading of selections in prose and poetry; presentation of scenes from plays. Prerequisite, Course 3; 1 hour. Credit, 1.

Assistant Professor McKay.

## *Department of Modern European Languages.*

### FRENCH.

### *Required Courses.*

1. Elementary French. — A beginning course. Fraser & Squair's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4.

Mr. Mackimmie.

2. ELEMENTARY FRENCH. — As stated under Course 1. Prerequisite, Course 1. Mr. MACKIMMIE.

3. INTERMEDIATE FRENCH (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. MACKIMMIE.

4. INTERMEDIATE FRENCH. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. MACKIMMIE.

5. ADVANCED FRENCH (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3. Mr. MACKIMMIE.

*Elective Courses.*

6. ADVANCED FRENCH (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatists will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3. Mr. MACKIMMIE.

7. FRENCH LANGUAGE OR LITERATURE (fourth year). — Courses in more advanced subjects; to be announced; 3 hours. Credit, 3. Mr. MACKIMMIE.

8. FRENCH LANGUAGE OR LITERATURE. — As outlined under Course 7. Mr. MACKIMMIE.

### SPANISH.

*Elective Courses.*

1. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4. Mr. MACKIMMIE.

2. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. MACKIMMIE.

### GERMAN.

#### *Required Courses.*

1. ELEMENTARY GERMAN. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. ASHLEY.

2. ELEMENTARY GERMAN. — As stated under Course 1. Prerequisite, Course 1. Mr. ASHLEY.

3. INTERMEDIATE GERMAN. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. ASHLEY.

3A. INTERMEDIATE GERMAN. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. ASHLEY.

4. INTERMEDIATE GERMAN. — As stated under Course 3. Prerequisite, Course 3. Mr. ASHLEY.

4A. INTERMEDIATE GERMAN. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3. Mr. ASHLEY.

5. ADVANCED GERMAN. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Conducted in German. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3.
Mr. ASHLEY.

### *Elective Courses.*

6. ADVANCED GERMAN. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Mr. ASHLEY.

7. MODERN GERMAN. — Reading of articles from the best modern German periodicals, such as "Ueber Land und Meer;" conversation and composition work based on text. "Ferien in Deutschland," prepared by instructor; 3 hours. Credit, 3. Mr. ASHLEY.

8. MODERN GERMAN. — As stated under Course 7. Mr. ASHLEY.

## *Music.*

### *Elective Courses.*

1. HISTORY AND INTERPRETATION OF MUSIC. — History of music among the ancients; medieval religious and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Mr. ASHLEY.

2. HISTORY AND INTERPRETATION OF MUSIC. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1. Mr. ASHLEY.

## *Department of Political Science.*

### *Required Courses.*

1. ECONOMICS. — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system; and the principles of consumption, production, exchange and distribution. Text-books, lectures and essays; required, but may be taken in either the junior or the senior year; 3 hours. Credit, 3. Assistant Professor EYERLY.

### *Elective Courses.*

2. GOVERNMENT. — The organization and working of the various kinds of government in the United States; government problems connected with transportation, taxation and monopolies;

comparison of State leadership in American agriculture with that in European agriculture. Text-books, lectures and assigned reading; 3 hours. Credit, 3. Assistant Professor EYERLY.

3. SOCIOLOGY. — The nature, scope and principles of sociology; social origins and structures; control by custom, religion, education, public opinion, law, etc.; social ideals; practical problems in social progress. Lectures, text-book and assigned readings; 3 hours. Credit, 3. . Assistant Professor EYERLY.

4. ECONOMIC HISTORY. — The economic history of England to the reign of Henry VIII.; the history of England and the American colonies in conjunction to 1783; and thereafter the history of England and of the United States. Emphasis is laid on economic history, but the more important political and religious movements are treated in their economic relations. Text-books, lectures and assigned reading; 3 hours. Credit, 3.

Assistant Professor EYERLY.

5. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3.

Mr. HOLCOMB.

6. PRACTICAL PROBLEMS IN ECONOMICS. — An advanced course following Economics 1. A group of problems will be selected for careful study. Each student will make a special study of one of the following topics: labor, capital, money, banking, insurance, protection and free trade, railways, corporations, and the personal distribution of wealth. Lectures, assigned readings and reports; 3 hours. Credit, 3. Assistant Professor EYERLY.

8. THE HISTORY OF IDEALS. — This course treats history from the idealistic, rather than from the economic, point of view. It attempts to define the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the

causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. Lectures and reading; 3 hours. Credit, 3. Mr. HOLCOMB.

## *Department of Mathematics, Physics and Civil Engineering.*

Professor OSTRANDER, Associate Professor HASBROUCK, Captain MARTIN, Mr. DUNCAN.

### *Required Courses.*

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; binomial theorem, undetermined coefficients, summation of series, continued fractions, logarithms, theory of equations. Wells's "College Algebra." Freshmen; 5 hours a week. Credit, 5.
Associate Professor HASBROUCK, Captain MARTIN and Mr. DUNCAN.

2. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Gore's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY. — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.
Associate Professor HASBROUCK, Captain MARTIN.

5. GENERAL PHYSICS. — Elementary mechanics and heat. Lectures, recitations and laboratory work. Text-book and lectures. Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5. Adjunct Professor HASBROUCK and Mr. DUNCAN.

*Elective Courses.*

6. GENERAL PHYSICS. — Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.

Adjunct Professor HASBROUCK and Mr. DUNCAN.

[9. ADVANCED PHYSICS. — The senior elective in physics is not offered for the year 1910–11.

Adjunct Professor HASBROUCK.]

8. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.

Mr. DUNCAN.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2 and 4; 3 hours a week. Credit, 3.

Professor OSTRANDER.

10. DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Granville and Smith's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 4 and 7; 5 hours. Credit, 5.

Professor OSTRANDER.

[11. HYDRAULICS AND SANITARY ENGINEERING.[1] — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures; 3 hours. Not given in 1910–11. Credit, 3.

Professor OSTRANDER.]

[12. ADVANCED SURVEYING.[1] — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures; 6 hours. Not given in 1910–11. Credit, 5. Professor OSTRANDER.]

13. STRESSES IN STRUCTURES.[1] — An elementary course in roof

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[1] Instruction in civil engineering will be given in two distinct courses of one year each, the courses alternating. The courses are open to students of the junior and senior classes.

and bridge stresses. Text-book and lectures; 4 hours. Not given in 1911–12. Credit, 3. Professor **Ostrander.**

14. Strength of Materials, Foundations and Masonry Construction.[1] — Text-book and lectures; 6 hours. Not given in 1911–12. Credit, 5. Professor **Ostrander.**

15. Analytic Mechanics. — A course in theoretical mechanics, based on the calculus, with applications to problems. Text-book and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Credit, 3. Professor **Ostrander.**

## *Department of Military Science and Tactics.*

**Captain Martin.**

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

### *Required Courses.*

1. Introduction to Military Science and Tactics. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards;

outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

2. INTRODUCTION TO MILITARY SCIENCE AND TACTICS. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

3. PRACTICE OF MILITARY SCIENCE AND TACTICS. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

4. PRACTICE OF MILITARY SCIENCE AND TACTICS. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

5. THEORY OF MILITARY SCIENCE AND TACTICS. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1.
Captain MARTIN.

6. THEORY OF MILITARY SCIENCE AND TACTICS. — As stated under Course 5. Sophomores; 1 hour. Credit, 1.
Captain MARTIN.

7. PRACTICE OF HIGHER MILITARY SCIENCE AND TACTICS. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

8. PRACTICE OF HIGHER MILITARY SCIENCE AND TACTICS. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

9. THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports, returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1. Captain MARTIN.

10. THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — As stated under Course 9. Juniors; 1 hour. Credit, 1. Captain MARTIN.

*Elective Courses.*

11. ADVANCED MILITARY SCIENCE AND TACTICS. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1. Captain MARTIN.

12. ADVANCED MILITARY SCIENCE AND TACTICS. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1. Captain MARTIN.

## *Department of Physical Education and Hygiene.*

Assistant Professor REYNOLDS.

### HYGIENE.

*Required Courses.*

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1. Assistant Professor REYNOLDS.

### PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]

*Required Courses.*

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen: 3 hours. Credit, 1. Assistant Professor REYNOLDS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1.
Assistant Professor REYNOLDS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

4. GRADED GYMNASTICS. — As stated under Course 3.
Assistant Professor REYNOLDS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit, 1. Assistant Professor REYNOLDS.

6. HEAVY GYMNASTICS. — As stated under Course 5.
Assistant Professor REYNOLDS.

*Elective Courses.*

7. TRAINING COURSE. — Leadership class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1.
Assistant Professor REYNOLDS.

8. TRAINING COURSE. — As stated under Course 7.
Assistant Professor REYNOLDS.

9. ADVANCED GYMNASTICS. — For those who wish to become candidates for the gymnastic team. Credit, 0.
Assistant Professor REYNOLDS.

10. ADVANCED GYMNASTICS. — As stated under Course 9.
Assistant Professor REYNOLDS.

## *Department of Rural Social Science.*

President BUTTERFIELD, Assistant Professor EYERLY, Assistant Professor CANCE.

### AGRICULTURAL ECONOMICS.

*Required Courses.*

2. AGRICULTURAL INDUSTRY AND RESOURCES. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers'

demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Assistant Professor CANCE.

*Elective Courses.*

4. ELEMENTS OF AGRICULTURAL ECONOMICS. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; the agricultural market; determination of price; speculation; problems of land tenure and land values; business co-operation; farmers' organizations; the farmer and legislation; the maintenance of the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3.

Assistant Professor CANCE.

5. HISTORICAL AND COMPARATIVE AGRICULTURE. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Assistant Professor CANCE.

6. CO-OPERATION IN AGRICULTURE. — The course contemplates a somewhat comprehensive view of the history, principles and social relations of agricultural organization for profit. Part I., The business aspects of co-operation: (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of business organization of agriculture abroad, and the

present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, as illustrated by the most advanced and prosperous business organizations and exchanges, with particular reference to the marketing of perishable products. Part II., Social aspects of co-operation: The second part of this course treats of the social conditions necessary to successful co-operation; the effect of co-operation on character, *e.g.,* on individualism, conservatism; the relation of co-operation to political achievement, especially as illustrated in European countries; the influence of co-operation in begetting a community consciousness; and the effect of organization on class status. Lectures, assigned reading and practical exercises; 3 hours. Credit, 3.

Assistant Professor CANCE (Part I.)
Assistant Professor EYERLY (Part II.).

7. SPECIFIC PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems; land tenure; size of farms; causes affecting land values; private property in land; taxation and inheritance; special problems; marketing and manufacturing farm products; cost of production; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 hours a week. Credit, 2.

Assistant Professor CANCE.

9. SEMINAR. — Research in agriculture: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.

Assistant Professor CANCE.

10. SEMINAR. — As stated in Course 9.

Assistant Professor CANCE.

### RURAL SOCIOLOGY.

*Elective Courses.*

12. THE RURAL COMMUNITY. — There are two general divisions of the subject. There is, first, a study of the social status of the rural population, including the significance of the movement to the cities, the present social conditions of farm people, the social effects of rural life, and the social aspect of various agricultural questions of a technical or economic character. In the second part of the study will be discussed the various social agencies in rural progress, such as means of communication, farmers' organizations, rural schools, means of agricultural education, rural religious institutions and the federation of rural social agencies. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President BUTTERFIELD and Assistant Professor EYERLY.

16. RURAL LITERATURE. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted Nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities; 3 hours. Credit, 3.
Mr. HOLCOMB.

## *Department of Veterinary Science.*

Professor PAIGE.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

*Elective Courses.*

1. INTRODUCTORY BACTERIOLOGY. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 two-hour laboratory exercises. Credit, 3.
Professor PAIGE.

3. VETERINARY SCIENCE. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of

veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor PAIGE.

4. VETERINARY SCIENCE. — As stated under Course 3. Professor PAIGE.

## *Department of Zoölogy and Geology.*

Assistant Professor GORDON.

### ZOÖLOGY.

### *Required Courses.*

1. ELEMENTARY ZOÖLOGY. — This course in a general way constitutes the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

### *Elective Courses.*

3. INVERTEBRATE ZOÖLOGY. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 4. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

5. ANIMAL PARASITES. — A survey of this special field of zoölogy. Laboratory and lecture work, with outside reading. Laboratory technique. Seniors; not open to fewer than 3 students. Prerequisites, Courses 1, 3 and 4. Three two-hour periods, 2 one-hour periods. Credit, 5. Assistant Professor GORDON.

6. ANIMAL PARASITES. — A continuation of Course 5. Two two-hour periods, 1 one-hour period. Credit, 3.

7, 8 and 9. ADVANCED ZOÖLOGY. — See "Graduate School." Assistant Professor GORDON.

### GEOLOGY.

*Elective Courses.*

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 two-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

# THE GRADUATE SCHOOL.

# THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

HENRY T. FERNALD, Ph.D., Acting Director of the Graduate School and Professor of Entomology.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

## ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.
2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

### NATURE AND METHODS OF GRADUATE WORK.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

## THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

The thesis in its final form, ready for the printer, must be submitted to the director of the school for examination by the committee on the graduate school before the candidate for the degree may take the required oral examination. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in the thesis.

All theses become the property of the department in which they are prepared. When they are printed, five copies of each thesis must be deposited with the department.

## FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

## DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

### COURSES FOR DEGREE OF MASTER OF SCIENCE.

Available either as major or minor subjects for the degree of master of science: —

**Agriculture.**
**Botany.**
**Chemistry.**
**Entomology.**
**Horticulture.**
**Mathematics and physics.**
**Veterinary science.**

### COURSES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Available for a major subject for the degree of doctor of philosophy: —

**Botany.**
**Chemistry.**
**Entomology.**
**Horticulture.**

Available for a minor subject for the degree of doctor of philosophy: —

**Agriculture.**
**Botany.**
**Chemistry.**
**Entomology.**
**Horticulture.**
**Zoölogy.**

## GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

### (*a*) *Major Courses.*

BOTANY. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The following subjects in chemistry may be studied: —

(*a*) Inorganic analysis, qualitative (of the rarer elements) and quantitative.
(*b*) Crystallography.
(*c*) Physical chemistry.
(*d*) Descriptive and determinative mineralogy.
(*e*) Chemical geology.
(*f*) Soil formation.
(*g*) Soil physics and chemistry; gas analysis; synthetic inorganic work.
(*h*) Chemical theory and history.
(*i*) General organic chemistry.
(*j*) Special topics in organic chemistry.

(*k*) Elementary quantitative organic analysis.

(*l*) Proximate qualitative and quantitative organic analysis, including determination of organic radicles.

(*m*) Organic synthesis of aliphatic and aromatic compounds.

(*n*) Problems in chemical manufacture.

(*o*) Recent chemistry of plant nutrition.

(*p*) Animal physiological and pathological chemistry, including the chemistry of foods, of milk and milk industries, of urine, urinalysis, and the standards for feeding of all kinds.

(*q*) Toxicology.

(*r*) Insecticides and fungicides.

Frequent examinations on current chemical literature are given. Early in the course original work on some chemical subject pertaining to agriculture must be begun. The history and results of this work must, before the awarding of the degree, be submitted in the form of a thesis containing a distinct contribution to knowledge.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogamy; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

### (*b*) *Minor Courses.*

ZOÖLOGY. — The courses in zoölogy are offered as a minor course to candidates for the degree of doctor of philosophy. They constitute an intensive course designed to give a broad outlook and to meet the needs of the specialist, and call for original investigation, laboratory dissection, technique and museum work. The subjects treated and the work done will vary according to circumstances, but may be outlined thus: —

(*a*) General and comparative anatomy, both gross and microscopic; ontogeny and phylogeny; life cycles, metamorphosis and metagenesis; animal associations, colonial, commensal and parasitic, and symbiotic associations of animals and plants; adaptation, adaptive radiation and parallelisms.

(*b*) Geologic, geographic and bathymetric distribution of animals.

(*c*) Systematic zoölogy, including paleozoölogy; museum and field technique.

(*d*) Economic zoölogy.

(*e*) History and development of zoölogical science.

(*f*) Weekly seminar and journal club meetings, in which all advanced students of zoölogy take an active part.

(*g*) Collateral reading; general knowledge of current zoölogical literature.

OTHER SUBJECTS. — Courses in the other subjects open to choice as minors will be outlined according to the qualification and needs of the students applying for them.

# EXTENSION WORK.

# EXTENSION WORK.

The extension work of the college includes the short courses and the outside activities, such as correspondence courses, lecture courses and itinerant instruction of various forms away from the college.

## SHORT COURSES.

A. **Organization, Expenses and Admission.**
B. **The Winter School.**
C. **The Summer School.**
D. **Itinerant Instruction.**

## A. ORGANIZATION, EXPENSES AND ADMISSION.

ORGANIZATION. — The work of the short courses in the college was organized in September, 1909, with a director in charge.

The object of the short course work is three fold: —

(1) To bring to the college for instruction for a few days or a few weeks as many people as can possibly be reached in this way.

(2) To disseminate, by various methods, agricultural information to people who cannot come to the college even for a short time.

(3) To make the college as useful as possible to all the people of the Commonwealth who are interested in agriculture and country life.

The work has been organized thus: —

### 1. *The Winter School.*

Ten weeks' general course.
Poultry course.
Farmers' week.
Beekeepers' course.

### 2. *The Summer School.*

Courses in practical agriculture and horticulture.

Courses in elementary sciences bearing on agriculture and horticulture.

Home economics.

Courses in agricultural education.

Courses in agricultural economics and rural sociology.

Courses especially for clergymen and rural social workers.

Conferences for clergymen, school superintendents, librarians and others.

Evening lectures by eminent educators.

Excursions to various points of interest in the vicinity.

### 3. *Itinerant Instruction.*

Correspondence courses.

Lecture courses.

Practical field demonstrations.

Travelling schools.

Educational trains (steam and trolley).

Educational exhibits at fairs.

Demonstration orchards.

Demonstration field experiments.

Services of expert agricultural authorities.

Agricultural surveys.

Advisory work with schools, State institutions and individuals.

Student extension work.

EXPENSES IN THE SHORT COURSES. — The expenses of attending either of the short courses will be about as follows: —

| | |
|---|---|
| Tuition to citizens of the United States, | Free. |
| Furnished rooms with private families, per week, | $1–$3 |
| Board at college dining hall, per week, | $4 |
| Board with private families, per week, | $4–$5 |

Students in either of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work; the cost in Amherst is about $1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic before entering. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women. Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character.

Application for admission should be made as early as possible. Students should report to the professor in charge on Monday, Jan. 2, 1911, in order to begin work promptly on the morning of January 3.

## B. THE WINTER SCHOOL.

1. The Ten Weeks' Course.
2. The Short Course in Poultry Management.
3. Farmers' Week.
4. Beekeepers' Course.

### 1. The Ten Weeks' General Course.

### Jan. 3–March 10, 1911.

Agriculture, Dairying, Fruit Growing, Floriculture, Market Gardening, Veterinary Science, etc.

*a.* Courses of Instruction.
*b.* Other Information.

### *a. Courses of Instruction.*

1. Soil fertility. Prof. Wm. D. Hurd. Three exercises a week for eight weeks.
2. Market gardening. Mr. C. S. Heller. Three exercises each week for ten weeks.
3. Fruit growing. Prof. F. C. Sears. Five exercises each week for ten weeks.
4. Floriculture. Prof. E. A. White. Five exercises each week.
5. Field crops. Prof. S. B. Haskell. Three exercises each week for ten weeks.
6. Breeds and breeding. Prof. J. A. McLean. Three exercises weekly, with appointed hours for stock judging.
7. Feeding and management. Prof. J. A. McLean. Two exercises weekly.
8. Animal diseases and stable sanitation. Dr. J. B. Paige. Two exercises each week.
9. Dairying. Prof. W. P. B. Lockwood and assistants. Three one-hour, 2 two-hour and 2 three-hour periods.
10. Dairy bacteriology. Prof. W. P. B. Lockwood. Two exercises each week.
11. Botany. Prof. A. V. Osmun and others. Three exercises each week.
12. Entomology. Dr. H. T. Fernald and assistants. Three exercises each week.
13. Mechanics. Prof. W. P. B. Lockwood and Mr. Wallace. One exercise of two hours each week.
14. Farm accounts. Prof. J. A. Foord. One exercise each week.
15. Farm buildings and machinery. Prof. J. A. Foord and Mr. E. H. Forristall. One exercise a week for ten weeks.
16. Landscape gardening. Mr. John Noyes. Twenty exercises.
17. The farmer and the community. Two periods a week.
    The development of the rural community, President Butterfield.
    Farm labor, immigration and farmers' organizations, Dr. Cance.
    The government in rural communities, Professor Eyerly.
    The educational problems of rural communities, Professor Hart.
    Agricultural literature, Professor Holcomb.

18. Forestry. Prof. F. F. MOON. Six lectures.
19. Meat, meat production and marketing on the farm. Mr. H. P. HINKLEY of Armour & Co. One demonstration each fortnight.

### *b. Other Information.*

ASSEMBLY. — All students of the college are required to attend a weekly assembly, at which an address of general interest is usually given. Attendance at morning chapel service, four times each week, is also required.

## 2. POULTRY COURSE.

### FEBRUARY 27 TO MARCH 10, 1911.

The purpose of this course is to give information to people interested in the poultry business.

Some of the best authorities on the subject of poultry breeding and management in this country have been secured to give the lectures and practical demonstrations.

An effort will be made to make the course a "practical" one, touching the vital problems of the poultry business.

Classes begin Monday, February 27, at 2 P.M.

Instruction will be given by specialists in poultry management, as follows: —

Prof. J. C. GRAHAM, Professor of Poultry Husbandry.
Mr. JOHN H. ROBINSON, Boston, Mass., editor of "Farm Poultry," author, and recognized authority on poultry subjects.
Prof. JAMES E. RICE, Professor of Poultry Husbandry, Cornell University, Ithaca, N. Y.
Mr. EDWIN F. GASKILL, in charge of poultry experiments at Massachusetts Experiment Station, Amherst, Mass.
Mr. D. J. LAMBERT, in charge of poultry work at Rhode Island State College, Kingston, R. I.
Mr. HENRY D. SMITH, Rockland, Mass.

Besides the poultry specialists mentioned above, the following members of the faculty of the Massachusetts Agricultural College will also give instruction in the poultry course: —

Prof. WILLIAM D. HURD, Director of Extension Work.
Dr. JAMES B. PAIGE, Professor of Veterinary Science.
Prof. FRED C. SEARS, Professor of Pomology.
Mr. C. S. HELLER, Instructor in Vegetable Gardening.
J. A. MCLEAN, Professor of Animal Husbandry.
Mr. CLARENCE A. JEWETT, Superintendent of Buildings.

### *Special Evening Lectures and Other Features.*

Throughout the course evening lectures of a popular nature will be given.

The poultry course occurs during the last two weeks of the ten weeks' short winter course, so that those who attend the poultry course may take advantage of the lectures offered in this course as well.

Farmers' week occurs at the college the week following the close of the poultry course. Every one should plan to remain over for this.

Trips will be made to nearby commercial poultry plants to study methods, etc.

### *Poultry Show.*

On March 8, 9 and 10, in connection with the work of the short poultry course, a poultry show will be held. This will be organized along the lines of any well-conducted show, the idea being to give the students training in preparing birds for exhibition and in showing them.

Send for entry blanks.

## 3. FARMERS' WEEK.

### MARCH 13–17, 1911.

The work given in the 1910 farmers' week was as follows. A broader and more complete program will be carried out the present year.

### *Purpose and Organization of Farmers' Week.*

Farmers' week is given by the Massachusetts Agricultural College for the benefit of those who cannot leave their homes or business for a sufficient length of time to take the other short courses.

Farmers' week is divided into sections, so that all who attend may find work of interest to them in progress each day.

1. General agricultural section, — including animal husbandry, dairying and poultry raising. Features of this section are "corn day," with a big corn show, and "dairy day," with exhibits of dairy machinery and dairy products.

2. General horticultural section,— including fruit growing, market gardening, floriculture and forestry. A feature of this section is "apple day."

3. Women's section, — home economics, domestic science and home making.

Eminent people are secured for the evening meetings. One day is given up to a discussion of problems of "community building."

### 4. Beekeepers' Course.

May 24–June 7, 1911.

*Announcement.*[1]

Throughout the year the Massachusetts Agricultural College has been receiving calls for a course in beekeeping. To meet the demand, a short course, covering the lines indicated, has been arranged.

During the past year the college has come into possession of about twenty colonies of bees and some other equipment. These, together with the swarms owned by the college faculty, will give most excellent equipment.

The work as laid out is of the most practical nature, and every attempt will be made to emphasize the points which are of the most value, yet are little understood by those engaged in this industry.

The following experts in beekeeping have given the work: —

#### *Courses and Faculty.*

1. Practical phases of beekeeping. Dr. Burton N. Gates.
2. Crops for honey bees. Dr. Wm. P. Brooks.
3. The relation of bees to the pollination of plants. Dr. George E. Stone.
4. The origin and evolution of the honey bee. Dr. Henry T. Fernald.
5. Bees and beekeepers' supplies. Dr. James B. Paige.

## C. THE SUMMER SCHOOL.[2]

July 3–Aug. 4, 1911.

1. Announcement, Purpose, Plan.
2. Faculty.
3. Election of Courses.
4. Conference for Rural Social Workers.

### *1. Announcement and General Plans.*

The summer school of agriculture and country life at the Massachusetts Agricultural College opened July 11, 1910, for a term of nearly five weeks, closing August 12. This was the fourth session of this summer school, those of the past three years having been highly successful. The experience of these three years aided in making material improvements for the session of 1910.

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[1] 1910 course; 1911 course not yet ready.

[2] Description here given is for the 1910 school.

The work of the summer school was designed originally for school teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Extended courses will be offered for the benefit of such persons also.

From the courses it will be possible to make up programs of work suitable to the needs of almost every one, but especially to school teachers, principals, superintendents, school committeemen, farm owners, householders, suburban residents, clergymen, pastors, preachers, social workers, and those who have only a general interest in agriculture. Persons who are in doubt as to what courses will best suit their needs would better correspond with the director of the summer school, who will gladly advise in all such matters.

The formal instruction in the summer school was given in thirty definite courses, herein described. From these each pupil might elect courses providing not less than ten nor more than fifteen exercises a week, unless a larger or smaller amount of work be allowed by the director. These courses included a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises will be arranged for one afternoon of each week. These will be on topics of interest to all. Class excursions will be arranged for every Wednesday afternoon, and more extended excursions for the whole school will be planned for every Saturday. These excursions will be in charge of an instructor as heretofore. In the past they have proved a very enjoyable feature of the work.

Round tables and special discussions will be arranged by various instructors as their courses require. A conference of rural social workers and educators of New England was held August 9, 10, 11 and 12. An outline of the conference will be found in another part of this bulletin.

A course of evening lectures on popular topics relating to the work of the school was a feature of the general program. Like everything else connected with the summer school this lecture course is entirely free to all students.

### *2. Faculty.*

1. Soils and tillage. Assistant Prof. S. B. HASKELL. Five exercises weekly the first two weeks. Should be followed by Course 2.
2. Field crops. Assistant Prof. S. B. HASKELL. Five exercises each week for second two weeks. Should be preceded by Course 1.
3. Fruit growing. Prof. F. C. SEARS. Limited to 30 pupils. Five exercises weekly for four weeks.
4. Practical gardening. Mr. C. S. HELLER. Course limited to 20 pupils. Five exercises weekly, two hours each, first four weeks.
5. The study of landscape. Prof. E. A. WHITE. Five exercises weekly, first two weeks.
6. Trees and shrubs. Prof. E. A. WHITE. Five exercises weekly, second two weeks of the term. This course is especially suited to follow Course 5 and to precede Course 7.
7. Forestry. Prof. E. A. WHITE. Lectures and field exercises, five exercises weekly.
8. Domestic animals. Mr. R. L. GRIBBEN. Five hours a week, first four weeks.
9. Modern dairying. Associate Prof. W. P. B. LOCKWOOD. Five exercises weekly for four weeks.
10. School gardening. Prof. W. R. HART. Five exercises a week, first two weeks.
11. Agricultural pedagogy. Prof. W. R. HART. Five exercises weekly, beginning July 25.
12. School agriculture. Assistant Prof. F. B. JENKS. Five exercises weekly for four weeks.
13. Elementary chemistry. Associate Prof. J. CHAMBERLAIN and Assistant Prof. F. S. HOWARD. Five exercises weekly for four weeks.
14. Agricultural high school chemistry. Associate Prof. J. CHAMBERLAIN and Assistant Prof. F. S. HOWARD. Five hours a week, four weeks.
15. Plant experiments. Prof. G. E. STONE. Five exercises weekly for two weeks.
16. Plant life. Assistant Prof. A. V. OSMUN. Five lectures weekly for two weeks, beginning July 25.
17. Cryptogamic botany. Assistant Prof. A. V. OSMUN. Two three-hour exercises weekly for two weeks.
18. Bird life. Mr. C. J. MAYNARD. Five exercises weekly, first two weeks.
19. Insect life. Mr. R. MATHESON. Three class and two laboratory periods for four weeks.
20. Entomology. Mr. R. MATHESON. Three lectures and two laboratory periods for four weeks.
21. Domestic science for rural school teachers. Miss H. RINAKER. Three lectures and two cooking demonstrations weekly for four weeks.
22. Domestic science and home economics. Miss H. RINAKER. Three lectures and two demonstrations weekly for four weeks.
23. Household science. Miss H. RINAKER. Three lectures and two demonstrations of cooking weekly, beginning July 25.
24. New England agriculture. Prof. W. D. HURD. Five exercises weekly.

25. Agricultural economics. Assistant Prof. A. E. CANCE. Five lectures weekly.
26. Development of the rural community. President K. L. BUTTERFIELD. Lasts two weeks.
27. The church and the rural problem. Rev. W. L. ANDERSON. Five lectures weekly.
28. The country school and the rural community. Miss M. CARNEY. Lectures beginning August 1.
29. Forms of co-operation among farmers. Assistant Prof. E. K. EYERLY. Ten lectures.
30. Rural literature. Mr. G. M. HOLCOMB. Ten lectures.
31. The movement in agricultural education. Prof. W. R. HART. Ten lectures.

### *3. Election of Courses.*

Election of courses should be made at the time of registration. Every election is subject to the approval of the director and of the instructor whose course is elected. As it will be necessary to schedule several courses at the same hour, certain combinations of courses will be made unavailable. It should be especially noticed that certain courses are offered to a limited number of pupils only, and, as a rule, pupils will be accepted in these courses in the order of application. Each pupil should choose such combinations of courses as will keep two or three subjects in hand at the same time. This will meet the requirement that each one must take at least ten and not more than fifteen exercises a week, unless permitted to take more or less by special order of the director.

Attendance will be required in the courses elected. Some sort of examination, test or permanent note-book will be required in each course. Those who complete the courses in a satisfactory manner, including practically perfect attendance, will be given certificates at the close of the term showing what work has thus been completed.

There are no rules or regulations whatever. Persons are not admitted to the summer school who are not old enough to know how to behave, and every one is expected to know and conform to the usages of good society. This absence of rules has worked admirably in the past, and it gives every one a sense of freedom based on personal responsibility, the basis of all proper government, whether in school, college or the community.

### *4. Conference of Agricultural Educators and Rural Social Workers.*

The last four days of the summer school will be given over to a conference of agricultural educators, rural social workers and others who are interested in developing country life. As its name indicates, this will be a conference in every sense of the word, every one being expected to take part in the informal discussions.

It is expected that persons representing the following lines of work will be present: rural school teachers, grade teachers of agriculture, high school teachers of agriculture, college teachers of agriculture, rural clergymen, rural librarians, grange lecturers, village improvement societies and others.

The plan of the program will be as follows: each of the above sections of workers will be asked to arrange a program, covering two hours in length, for their respective sections each forenoon. An afternoon general section will be held, at which some subject, such as the education of rural communities, the social life of rural communities, the religious life of rural communities, and the organization of forces for rural betterment, will be taken up each day.

Among the prominent speakers at the 1910 conference were Dr. S. A. Knapp of Washington, D. C., Dr. Josiah Strong of New York City, and Prof. Charles Zueblin of Winchester, Mass.

The bulletin of the 1911 summer school will be ready about March 1, and can be had by applying to the director.

## D. ITINERANT INSTRUCTION.

1. **Correspondence Courses.**
2. **Lecture Courses.**
3. **Other Itinerant Instruction.**

### 1. The Correspondence Courses.

#### *a. Purpose and Description of the Work.*

The correspondence courses announced in this circular are offered by the Massachusetts Agricultural College in response to calls from all sections of the State, from people who desire agricultural information, but who, for various reasons, cannot come to the college for it. These courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists and teachers, either in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice have changed and are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added later.

### *b. Method of conducting the Work.*

While a large number of books have been written on various agricultural subjects, few of them are especially adapted to correspondence course work. For this reason our courses are conducted principally by especially prepared lessons. These lessons partake somewhat of the nature of the lectures given in the regular college work. Whenever possible, a text-book is used for reference and supplementary study.

The lessons are sent out one at a time by the college, and are either accompanied or followed by a list of questions. When these are satisfactorily answered or discussed, the next lesson is sent, and so on.

It is recommended that students take up the work in some logical order, *i.e.*, the courses in "soils" and "manures and fertilizers" should precede those in "field crops," "fruit growing" or "market gardening."

After these preliminary courses have been completed, two or more courses of study may be pursued at the same time, provided the student can devote sufficient time to the work to carry it on successfully.

The courses are especially recommended to granges for study, and it is to be hoped that grange lecturers, or some other interested person, will organize study classes. When this is done, a representative of the college will visit the grange from time to time to conduct the class, discuss the work and offer suggestions.

### *c. Description of Courses.*

1. Soil and soil improvement. Prof. W. D. HURD. The cost of the course is $1.
2. Manures and fertilizers. Prof. W. D. HURD. The cost of the course is $1.
3. Field crops. Assistant Prof. S. B. HASKELL. The cost of the course is $1.
4. Farm dairying. Associate Prof. W. P. B. LOCKWOOD. The cost of the course is $1.

5. Fruit growing. Prof. F. C. SEARS and Mr. A. J. NORMAN. The cost of the course is $1.
6. Market gardening. Mr. C. S. HELLER. The cost of the course, including the text-book, is $2.50.
7. Animal feeding. Mr. R. L. GRIBBEN and Mr. C. J. ROBINSON. The cost of the course is $1.
8. Floriculture. Prof. E. A. WHITE. The cost of the course is $1.
9. Farm accounts. Prof. J. A. FOORD. The cost of the course is $1.
10. Agriculture in the common schools. Assistant Prof. F. B. JENKS. The cost of the course, including the text-book, is $2.10.
11. Agricultural education. Prof. W. R. HART. The cost of the course is $1.
12. Beekeeping. Assistant Prof. B. N. GATES. The cost of the course is $1.
13. Forestry. Associate Prof. F. F. MOON. The cost of the course is $1.

### *d. Expenses of the Courses.*

In order that none shall enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of $1 for each course, payable in advance at the time of enrollment.

This fee is not charged to cover cost of preparing the course, for this, in time of the instructors, is many times what is received, but it is to defray expenses of postage and material used in the preparation of the lessons, and to insure a higher quality of work from those who enroll.

The cost of a text-book, when one is used, is in addition to this enrollment fee.

Remittances should be made by money order or check.

### *e. Enrollment.*

Students may enroll at any time by applying to the director of extension work, either personally or by letter. Enrollment should be made on the card which is furnished by the college.

Membership in the correspondence courses entitles the student to receive the books used in the various courses, and others, at reduced prices.

### *f. List of Reference Books for Supplementary Reading.*

For those who desire to add some of the latest books to their libraries, for teachers who wish material for their work, or for librarians who desire to place on the shelves of their libraries, the latest agricultural publications, arrangements have been made with the Orange Judd Publishing Company, Lafayette Place, New York City, N. Y., to supply books at reduced prices.

A classified list giving prices (postpaid) will be furnished by the college to all who apply for it.

## 2. The Lecture Courses.

The college also offers lecture courses. The lectures can be obtained by any agricultural organization, grange, farmers' club, board of trade, women's club, Young Men's Christian Association, church club or school, or by others who are interested in problems pertaining to agriculture and country life. Single lectures, or a series comprising a course, can be arranged for.

Lectures and Subjects. — The faculty of the college are, of course, men busy with regular college duties, and can undertake only so many outside lectures as will not seriously interfere with their regular college work. For this reason it is advisable that those desiring lectures for a fixed date should make a second, and perhaps a third, choice, also, of lecturers, in order to secure some one.

### *A Lecture without a Lecturer.*

The college is now prepared to send a stereopticon, a written lecture and a set of lantern slides to accompany the lecture to responsible persons who desire to use these before public gatherings. A rental fee of $1 and express both ways is charged. The following lectures will be ready for the winter of 1910–11: —

Clean milk, production and handling.
Apple growing.
Types and breeds of animals.
History, uses and culture of corn.
Potato growing.
The organization and work of the Massachusetts Agricultural College.
Home and school ground decoration.
Teaching agriculture, school gardening, etc., in the public schools.
Concrete: its use on the farm.

Other subjects will be announced later.

### *The Practical Demonstrations.*

The college is prepared to send an expert who will bring with him the necessary apparatus, whenever possible, to give practical demonstrations of different operations connected with agricultural practice. The following are some of the demonstrations most commonly given: —

The production and handling of clean milk.
Babcock milk testing.
Scoring and judging live stock.
Spraying fruit trees.
Packing apples.
Pruning and grafting.
Scoring and judging fruit.
Corn selection and judging.
Demonstrations in beekeeping as announced by Dr. Gates in circular.

Others may be given when requested.

### *Terms on which Lectures and Demonstrations are given.*

The idea of offering these lectures to the public is that as large a number of people of the State may receive the instruction as is possible. When no admission fee is charged, the lectures and object lessons will be given free, provided the organization or individual requesting the lecture will pay the traveling expenses of the person giving the lecture. When admission is charged, the lecturer shall receive compensation in addition to his traveling expenses.

Correspondence is invited regarding the selection of subjects for a course of lectures.

### 3. OTHER ITINERANT INSTRUCTION.

Besides the correspondence and lecture courses and the practical field demonstrations, the college is carrying on several kinds of itinerant instruction. Calls are constantly made on the college for help to be given at a distance from the institution; and to meet these calls a corps of field agents is being engaged. These men and women will serve as traveling instructors, giving instruction varying in length from a single lecture to traveling-school courses lasting several days.

DEMONSTRATION ORCHARDS. — The college is establishing these orchards in all sections of the State. The owner of the land furnishes four or five acres and signs a contract to carry out the instructions of the college for fifteen years. The college furnishes the trees, a spraying outfit and the necessary supervision free of charge. Renovation plots in neglected orchards are also taken by the college for improvement for a period of five years. Educational meetings are held at these orchards each season.

Educational Trains. — In the past year a train consisting of five cars, extensively equipped with demonstration apparatus, was run over the lines of the Boston & Albany Railroad. A trolley train of five cars was run over the trolley lines centering in Springfield. Fifteen lecturers and demonstrators accompanied these trains.

Educational Exhibits at Fairs. — The college makes exhibits at the principal fairs in the State. In connection with these exhibits an extensive lecture program is given.

Traveling Schools. — When so requested the college organizes itinerant schools of instruction, lasting from three to five days, in good agricultural centers. The program is somewhat similar to that given at the college "farmers' week." The program is given without cost, providing the cost of halls and advertising is met by the community where the school is held.

Traveling Libraries. — To meet an increasing demand for information concerning agricultural books the college is preparing to send to libraries and schools a collection of some of the best books on agriculture and allied subjects.

## *Extension Work by Students.*

In order to aid in a practical way in the solution of the problems in the rural community, a new line of work has been undertaken by the extension department as student extension work.

Members of the college Young Men's Christian Association who have shown ability in community building are largely employed in this form of extension. The object of the work is two-fold: (1) to develop the country boy and acquaint him with the possibilities of the farm, indirectly reaching his parents and ultimately amalgamating the various factors of the community for the purpose of fostering a more wholesome community spirit; (2) to train the college students to cope with the rural problem in order that later they may exercise the right leadership in the community.

The work is being developed with regard to religious, educational, social and physical interests. The religious work embraces the teaching of Bible classes, leadership in singing at Christian Endeavor and other meetings, the holding of meetings in different towns by members of the college Young Men's Christian Association, the encouragement of church socials, etc.

The educational work includes study of the social and economic problems of the town, the teaching of English to foreigners, conducting classes in agriculture, with practical work, lecturing on agricultural subjects, beautifying home grounds, developing home flower gardens, leading nature-study tramps, organizing debates and encouraging boys to further schooling.

The social effort is to encourage and develop all activities in town tending to create a broader and more unified community interest; such activities are church entertainments, school entertainments, musicals, etc.

Physical education is given through talks about clean living and physical culture, and by development of different branches of athletics under efficient moral leadership.

The plan involves much competition, tending to bring the people of the different towns into a closer relationship.

The work thus far has been confined to those communities within easy reach of the college, but it will gradually extend over a wider area. The work is popular and promises to become one of the most important agencies in the development of the rural community.

### *Miscellaneous Itinerant Instruction.*

A number of other kinds of work are demanded of the college through the extension work. Among these might be mentioned aid in the organization of crop and animal improvement societies, the conducting of demonstration experiments and plot tests in all sections of the State, making agricultural surveys, doing advisory work with schools, State institutions and individuals, furnishing the services of agricultural experts to those who need help, giving advice on farm management, and answering thousands of inquiries each year.

In short, the spirit of the extension work is that of service, and an effort is made through it to render the departments of the Massachusetts Agricultural College as helpful to the people of the Commonwealth as they can be. Correspondence is invited from any who desire such help as has been spoken of. Letters should be addressed to the Director of Extension Work, Massachusetts Agricultural College, Amherst, Mass.

# GENERAL INFORMATION.

# GENERAL INFORMATION.

## A. FINANCIAL AND ADMINISTRATIVE.

### STUDENT EXPENSES.

TUITION. — Tuition is free to citizens of the United States; but students who are citizens of Massachusetts should apply to the senator of the district in which they live for a free scholarship. Blank application forms may be obtained from the registrar. The tuition charged persons not citizens of the United States is $120 a year.

DORMITORIES AND BOARD. — The college has dormitory accommodation for about 64 students. The rooms in the dormitories are occupied chiefly by the upper classmen, hence new students are obliged to room in private houses. The rooms in the college dormitories are unfurnished. They are mostly in suites of three, — one study room and two bed rooms. They are heated with steam and lighted with electricity. Students care for their rooms themselves. The rent for each person ranges from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1.50 to $3 a week for each occupant. All correspondence in regard to rooms should be addressed to the dean of the college.

Board can be had at the college dining hall. Board is furnished at cost. At present the price of board is $4 a week. The price is determined by adding to the audited rate of the previous three months' period 5 per cent. At the end of the period, final settlement is made on the basis of actual cost.

### EXPENSES.

The necessary college expenses per year are estimated as follows: —

Tuition: Citizens of Massachusetts free through State scholarships; other citizens of the United States free; foreigners, $120 a year.

| | Low. | High. |
|---|---|---|
| Room in college dormitories or in private houses, | $39 00 | $110 00 |
| Board in college dining hall, $4 a week, | 144 00 | 144 00 |
| Laundry, 50 cents to 85 cents a week, | 18 00 | 30 00 |
| Military uniforms, first year, | 13 50 | 13 50 |
| Laboratory fees, | 2 00 | 20 00 |
| Books, stationery and other miscellaneous, | 23 50 | 32 50 |
| | $240 00 | $350 00 |

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial demands made upon students which they should expect to meet. Chief among these are class assessments, support for the Musical Association and the Y. M. C. A., and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, college "Signal" (paper), etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is assumed by students joining a fraternity. Students rooming in college dormitories are obliged to equip their rooms with furniture. The college assumes no responsibility in regard to the safe-keeping of student furniture in dormitories, either during term time or vacation, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling the economical student will probably spend between $250 and $350 a year.

## STUDENT AID.

SELF HELP. — A number of students find opportunities for earning money without depending on the labor fund, and many rely upon labor of some sort to earn their way through college. A few men have paid all their way through college; a great many more have paid a large part of their expenses; and many have earned a small proportion of the cost of their course. But the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself at work. The college does not encourage students to enter without money in the expectation of earning their way. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in college, or, instead, to borrow money with which to complete his course. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for labor-fund employment, no one man can receive a large amount from that source.

LABOR FUND. — An annual appropriation of $7,500 for student labor is received from the State. So far as possible needy students will be employed in some department of the college. The Department of Agriculture and the Department of Horticulture usually afford the most work. Application for student labor should be made directly to the president. Applicants must present a certificate signed by parent or guardian and by one of the selectmen of the town in which they reside, showing that they need the aid. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor.

SPECIAL NOTICE TO NEEDY STUDENTS. — *In the last year or two the demand for paid labor on the part of new students has exceeded the amount of employment that the college can offer. The college cannot promise work for any students, particularly freshmen. It accordingly urges prospective students who are dependent upon their own efforts not to undertake the course before they have enough money to carry them through or nearly through the first year.*

### STUDENT ACCOUNTS.

The following rules are in force concerning student accounts: —

No student will be allowed to graduate until all bills due from him to the institution are paid.

College charges, such as room rent, laboratory fees, tuition, etc., must be paid strictly in advance at the beginning of each semester. No student will be allowed to register until such payments are made.

Every student boarding at Draper Hall shall pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if more than one week in arrears in his payments.

All money due for student labor shall be applied on account toward any bills that the student may owe to the institution.

### LABORATORY FEES.

| | Per Semester. |
|---|---|
| Botany: — | |
| Graduates, | $4 00 |
| Courses 2, 3, | 3 00 |
| Course 4, | 2 00 |
| Course 5, | 1 00 |
| Courses 7, 9, 11, 13, | 3 00 |
| Chemistry: — | |
| Courses 1, 2, 11, 13 and 14, each, | 3 00 |
| Courses 4, 5 and 6, each, | 4 00 |
| Courses 9, 10, 15, 17A, B, C or D, 18A, B, C or D, | 5 00 |
| Entomology: — | |
| Graduate, | 3 00 |
| Entomology 3, | 3 00 |
| Entomology 4, | 3 00 |
| Landscape gardening: — | |
| Landscape gardening 1, 2, | 2 50 |
| Landscape gardening 3, 4, 7, 8, | 4 00 |
| Landscape gardening 6, | 1 00 |
| Drawing 1, 2, | 2 50 |
| Zoölogy: — | |
| Elementary 1, | 2 00 |
| Invertebrate 3, | 4 00 |
| Vertebrate 4, | 4 00 |

## B. ACADEMIC AND DEPARTMENTAL.

### DEGREES.

Those who complete the four-years course receive the degree of bachelor of science. Those who receive this degree may also, upon payment of a fee, receive the degree of bachelor of science (B.Sc.) from Boston University; but the candidate must meet the conditions imposed by the university concerning preparatory studies. The fee for graduation from the college is $5; that for the degree of Boston University is $10.

Graduate students who complete the assigned courses will receive the degree of master of science (M.Sc.) (fee, $10). Credit may sometimes be allowed toward this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study and present a satisfactory thesis will be granted the degree of doctor of philosophy (fee, $25).

Those to whom degrees are awarded must present themselves in person at commencement to receive them. Honorary degrees are not conferred.

### SCHOLARSHIPS AND PRIZES.

#### *Scholarships.*

The income of gifts from different persons is distributed in scholarships to worthy students requiring aid. The funds supporting these scholarships are: —

1. The Mary Robinson fund of $1,000, the bequest of Miss Mary Robinson of Medfield.

2. The Whiting Street fund of $1,000, the bequest of Whiting Street of Northampton.

3. The Henry Gassett fund of $1,000, the bequest of Henry Gassett of North Weymouth.

#### *Prizes.*

Prizes are given annually in several departments for excellence in study or for special achievement. The prizes offered for 1910 are: —

AGRICULTURE. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

Botany. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1911, a prize of $5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

Forestry. — The J. W. D. French prize ($25) is given by the Bay State Agricultural Society to that member of the senior class who writes the best essay on forestry.

General Improvement. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character and example.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declarations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

### *Winter Course Prizes for 1910.*

Given by the Bowker Fertilizer Company, Boston, to the student who is most familiar with the nature and composition of fertilizers and their use, one-half ton Stockbridge fertilizer.

### *Military Diplomas.*

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the Department of Military Science have shown themselves worthy of distinction.

These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

## EQUIPMENT.

AGRONOMY. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a surveyor's transit, a wye level, drainage levels, rods, steel tapes, surveyors' pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

ANIMAL HUSBANDRY. — The most important part of the equipment for laboratory work in animal husbandry is the new judging pavilion, which will be completed by Jan. 1, 1911. This will give new opportunities for practice work in management of live stock, together with demonstrations in judging. Another very essential part of the equipment for this department is the live stock of the college farm, which includes pure bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach and Percheron horses, and Berkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory, is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

CHEMISTRY. — The department of chemistry has rooms adapted to chemical uses, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 70 students. Immediately adjoining it are four smaller rooms for apparatus and the preparation of materials for the lecture table. The laboratory for beginners is furnished with 40 working-tables. Each table is provided with reagents and apparatus for independent work. A well-equipped laboratory for advanced work is also provided. The weighing room has 6 balances and improved apparatus for determining densities of solids, liquids and gases. The equipment includes also a microscope, a spectroscope, a polariscope, a photometer, a barometer, numerous models, and an extensive collection of industrial charts, and there is a valuable and growing collection of specimens and samples. The latter includes rocks, minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds. With this should also be mentioned a series of preparations used for illustrating the various stages of different manufactures, from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped. It will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump, methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room, provided with chemical desks and apparatus, methods for the determination of the impurities and adulterations of insecticides are taught. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building, the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

FARM ADMINISTRATION. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

FLORICULTURE. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

FORESTRY. — The aim of the course in forestry is to prepare men for the advanced study in forestry schools, and at the same time, by laying particular stress on local conditions, to enable them to handle the farm wood lot in the same scientific manner as the rest of the farm. The college is well situated for forestry study. There is a good forest nursery on the college grounds; also two typical farm wood lots. In the vicinity are considerable areas of typical New England forest land.

GEOLOGY. — A large, well lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has 6 large cases for exhibition purposes.

The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-years course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library — stack room, reading room and office — occupies the entire lower floor of the library-chapel building. It contains nearly 34,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a select collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS, PHYSICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

*Physics.* — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

POMOLOGY. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1909–10, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrous fruit from Florida and Texas.

PUBLIC SPEAKING. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollege contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the college Debating Club.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

ZOÖLOGY. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. On the second floor is a laboratory, 20 by 32 feet, for advanced work. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus. Small aquaria and vivaria will be added.

The large amphitheater lecture hall is used jointly by the departments of entomology and zoölogy-geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 2 floor cases, with space for 10 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 5 P.M. The curator is Assistant Professor Gordon.

## College Activities.

### *Religious Services.*

Chapel services are held four days a week. On Wednesday, instead of chapel an afternoon assembly is held, for which an attempt is made to secure speakers who will present important current subjects. Students are required to attend chapel and assembly.

The Young Men's Christian Association of the college holds a short religious meeting in the chapel on Thursday evenings, and conducts several Bible classes. For part of the year the college and the Young Men's Christian Association unite in Sunday vespers and in Sunday morning talks in the chapel. At vespers a prominent clergyman or layman speaks.

### *Student Organizations.*

A large number of student organizations furnish opportunity for work and leadership to students.

The Massachusetts Agricultural College Social Union has recently been established. All students become members by paying a small fee; the Union is designed to become the center of student interests. It has equipped in North College a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. The Union gives, in the fall and winter months, a series of entertainments, free to the students and faculty.

The Young Men's Christian Association is active both socially and religiously.

The College Senate is composed of representatives of the senior and junior classes. It serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The musical organizations include an orchestra, a glee club, and a quartette. These furnish music for college meetings, and occasionally give concerts. A military band is maintained as part of the cadet corps.

The Athletic Association represents in the college the interests of the football, baseball, track, hockey and tennis teams.

Among the other clubs are the Rifle Club, the Mettewampe Club, organized for walking and other outdoor recreation, and a debating club. Provision is made for credit for a specified amount of work done under supervision in the Debating Club, and intercollege debates are held. The Public Speaking Council was organized in March, 1910.

The college publications are the "Signal," published weekly by the student body, and the "Index," published annually by the junior class.

### *Clubs, Conferences and Seminars.*

The All M. A. C. Chemists is an organization of all persons interested in chemistry who have been connected with the college in the past or are now connected with it. This club, by meetings, lectures, excursions, etc., promotes instruction in practical agricultural chemistry.

The Stockbridge Club is an organization of students specially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

The Language Conference, meeting about once a month, is composed of the instructors in the departments of English and Modern Languages and the students who are enrolled in elective courses in these departments.

A seminar for juniors and seniors is conducted by the division of agriculture. The division of horticulture likewise conducts conferences or seminars.

An entomological club and a zoölogical club are also maintained by those specially interested in these departments of college work.

## PRIZES AWARDED FOR THE YEAR 1910.

GRINNELL PRIZES. — First prize, $25, Frank Tuttle Haynes; second prize, $15, Roger Sherman Eddy; third prize, $10, Francis Stone Beeman.

BOTANICAL PRIZES. — For the best herbarium, $15, Sumner Cushing Brooks. For the best collection of Massachusetts trees and shrubs, $10, Sumner Cushing Brooks. For the best collection of Massachusetts woods, $10, Sumner Cushing Brooks.

FORESTRY PRIZE. — For the best essay on arboriculture, $25, Edgar Morton Brown.

GENERAL IMPROVEMENT PRIZE. — Given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character and example; $25, Herbert James Stack.

PRIZES IN PUBLIC SPEAKING. — In debating: Irving Craig Gilgore, 1911, $15, and gold medal; Harold Francis Willard, 1911, $15, and gold medal; Benjamin Gilbert Southwick, 1912, $15, and gold medal. In oratory: Theodore Joseph Moreau, 1912, $20, and gold medal; Louis Brandt, 1910, $15. In declamation: Horace Mitchell Baker, 1913, $15; Frederick David Griggs, 1913, $10.

MILITARY HONORS. — The following officers were reported to the Adjutant-General of the United States and to the Adjutant-General of Massachusetts for their high merit in military work: Maj. Roger Sherman Eddy, Capt. Henry Alvan Brooks, Capt. Frank Tuttle Haynes, Capt. Horace Wells French, Capt. Edward Harrison Turner, First Lieut. Lawrence S. Dickinson.

# DEGREES CONFERRED AND ROLL OF STUDENTS.

# Degrees Conferred—1910.

## Master of Science.

Chapman, George Henry, Amherst, Massachusetts Agricultural College, B.Sc., 1907.

## Bachelor of Science (B.Sc.).

| | |
|---|---|
| Allen, Rodolphus Harold, | Fall River. |
| Annis, Ross Evered, | Natick. |
| Armstrong, Robert Pierson, | Rutherford, N. J. |
| Bailey, Dexter Edward,[1] | Tewksbury. |
| Bailey, Justus Conant, | Wareham. |
| Beeman, Francis Stone, | West Brookfield. |
| Blaney, Jonathan Phillips, | Swampscott. |
| Brandt, Louis, | Everett. |
| Brooks, Henry Alvan,[1,2] | Cleveland, O. |
| Brooks, Sumner Cushing,[2] | Amherst. |
| Brown, Louis Carmel,[1] | Bridgewater. |
| Burke, Edward Joseph,[2] | Holyoke. |
| Clarke, Walter Rowe,[1] | Milton-on-Hudson, N. Y. |
| Cloues, William Arthur, | Warner, N. H. |
| Cowles, Henry Trask,[2] | Worcester. |
| Damon, Edward Farnham,[2] | Concord Junction. |
| Dickinson, Lawrence Sumner,[1,2] | Amherst. |
| Eddy, Roger Sherman,[1] | Dorchester. |
| Everson, John Nelson, | Hanover. |
| Fisk, Raymond John, | Danvers. |
| Folsom, Josiah Chase,[1] | Billerica. |
| Francis, Henry Russell, | Dennisport. |
| French, Horace Wells,[1] | Pawtucket, R. I. |
| Haynes, Frank Tuttle,[1] | Sturbridge. |
| Hayward, Warren Willis, | Millbury. |
| Hazen, Myron Smith, | Springfield. |
| Holland, Arthur Witt, | Shrewsbury. |
| Hosmer, Charles Irwin, | Turners Falls. |
| Johnson, William Clarence,[1] | South Framingham. |
| Leonard, William Edward,[2] | Belmont. |
| McLaine, Leonard Septimus,[1,2] | New York, N. Y. |
| Mendum, Samuel Weis,[2] | Roxbury. |
| Nickless, Fred Parker, | Billerica. |
| Oertel, Charles Andrew, | South Hadley Falls. |
| Partridge, Frank Herbert, | Cambridge. |
| Paulsen, George William,[1] | New York, N. Y. |

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[1] Military diploma.

[2] Boston University diploma.

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|---|---|
| Schermerhorn, Lyman Gibbs,[1] | Kingston, R. I. |
| Thomas, Frank Lincoln,[1] | Athol. |
| Turner, Edward Harrison,[1] | Reading. |
| Urban, Otto Velorous Taft,[1] | Upton. |
| Vinton, George Newton, | Sturbridge. |
| Waldron, Ralph Augustus, | Hyde Park. |
| Wallace, William Newton,[2] | Amherst. |

Total, 43.

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[1] Military diploma.

[2] Boston University diploma.

# ROLL OF STUDENTS.

### GRADUATE STUDENTS. — CANDIDATES FOR A DEGREE.

| | | |
|---|---|---|
| Anderson, David Wadsworth,<br>B.Sc., New Hampshire State College, 1910. | Manchester, N. H., | – – |
| Bartlett, Oscar Christopher,<br>B.Sc., Massachusetts Agricultural College, 1909. | Westhampton, | – – |
| Bourne, Arthur Israel,<br>A.B., Dartmouth College, 1907. | Kensington, N. H., | – – |
| Holland, Edward Bertram,<br>M.Sc., Massachusetts Agricultural College, 1892. | Amherst, | 28 North Prospect Street. |
| McLaine, Leonard Septimus,<br>B.Sc., Massachusetts Agricultural College, 1910. | New York, N. Y., | – – |
| Merrill, Joseph Henry,<br>B.Sc., Dartmouth College, 1905. | Danvers, | – – |
| Regan, William Swift,<br>B.Sc., Massachusetts Agricultural College, 1908. | Northampton, | – – |
| Shaw, Jacob Kingsley,<br>B.Sc., University of Vermont, 1899; M.S., Massachusetts Agricultural College, 1908. | Amherst, | 1 Allen Street. |
| Smith, Philip Henry,<br>B.Sc., Massachusetts Agricultural College, 1897. | Amherst, | 102 Main Street. |
| Smulyan, Marcus Thomas,<br>B.Sc., Massachusetts Agricultural College, 1909. | Amherst, | – – |
| Summers, John Nicholas,<br>B.Sc., Massachusetts Agricultural College, 1907. | Campello, | – – |
| Thomas, Frank Lincoln,<br>B.Sc., Massachusetts Agricultural College, 1910. | Athol, | – – |
| Waters, Theodore Charles,<br>B.Sc., Massachusetts Agricultural College, 1909. | Rocky Hill, Conn., | – – |

### GRADUATE STUDENTS. — NOT CANDIDATES FOR A DEGREE.

| | | |
|---|---|---|
| Greenfield, Melvin Leroy,<br>A.B., Colgate, 1908. | Durhamville, N. Y., | 1 Allen Street. |
| Lawton, Ruth White,<br>A.B., Vassar College, 1910. | Longmeadow, | Longmeadow. |

Total, 15.

### SENIOR CLASS.

| | | |
|---|---|---|
| Adams, James Fowler,[1] | Melrose, | 11 South College. |
| Allen, Park West, | Westfield, | 18 South College. |
| Baker, Herbert Jonathan, | Selbyville, Del., | 15 North College. |
| Barrows, Raymond Corbin, | Stafford Springs, Conn., | 5 South College. |
| Bentley, Arnold Gordon,[1] | Hyde Park, | 4 South College. |
| Blaney, Herbert Wardwell, | Swampscott, | C. S. C. House. |
| Brown, Edgar Morton, | Merrick, | Theta Phi House. |
| Burnham, Arthur James,[1] | Holyoke, | 75 Pleasant Street. |
| Bursley, Allyn Parker, | West Barnstable, | Theta Phi House. |
| Conant, Arthur Theodore, | Sunderland, | 7 North College. |
| Damon, Charles Murray,[1] | Haydenville, | 20 South College. |
| Davis, Egbert Norton, | South Framingham, | 7 North College. |
| Davis, Irving Wilder, | Lowell, | Insectary, M. A. C. |
| Drury, Harold Blake, | Athol, | 6 North College. |

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[1] Work incomplete.

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| Dudley, John Edward, Jr.,[1] | Newton Center, | 11 North College. |
| Gilgore, Irving Craig, | Central Square, N. Y., | 4 South College. |
| Hill, Nathaniel Herbert,[1] | Princeton, N. J., | 17 South College. |
| Howe, Harold Hosmer,[1] | Springfield, | Wilder Hall, M. A. C. |
| Jenks, Albert Roscoe,[1] | Three Rivers, | Plant House, M. A. C. |
| Johnson, Leonard Matthews,[1] | Easthampton, | 6 South College. |
| Labouteley, Gaston E., | Lynn, | Plant House, M. A. C. |
| Larrabee, Edward Arthur, | Winthrop, | Clark Hall, M. A. C. |
| Lull, Robert Delano, | Windsor, Vt., | 9 Fearing Street. |
| McGraw, Frank Dobson,[1] | Fall River, | C. S. C. House. |
| McLaughlin, Frederick Adams, | Lee, | 15 North College. |
| Morse, Henry Bowditch,[1] | Salem, | 75 Pleasant Street. |
| Nagai, Isaburo, | Tokyo, Japan, | 10 North College. |
| Nickerson, George Payne, | Amherst, | 17 South College. |
| Nielsen, Gustaf Arnold,[1] | West Newton, | C. S. C. House. |
| Ostrolenk, Bernhard, | Gloversville, N. Y., | 12 North College. |
| Parsons, Samuel Raynolds, | North Amherst, | North Amherst. |
| Patch, Roland Harrison, | Wenham, | 4 North College. |
| Pauly, Herman Alfred, | Plainfield, Vt., | 14 North College. |
| Pickard, Percy William, | Hopedale, | 5 South College. |
| Piper, Ralph Waldo, | South Acton, | 12 South College. |
| Prouty, Frank Alvin,[1] | Worcester, | 9 South College. |
| Prouty, Philip Herman, | Shrewsbury, | West Experiment Station. |
| Racicot, Philias Armand, | Lowell, | 16 South College. |
| Robinson, Ralph Cushing, | Boston, | 9 South College. |
| Sharpe, Arthur Harris,[1] | Saxonville, | 2 South College. |
| Smith, Clarence Albert, | Northampton, | 12 South College. |
| Smith, Raymond Goodale,[1] | Lynn, | 3 Fearing Street. |
| Stevenson, Lomas Oswald, | Hackensack, N. J., | 87 Pleasant Street. |
| Warren, Edward Irving,[1] | Leicester, | 16 South College. |
| Whitney, Raymond Lee, | Brockton, | 6 Maple Avenue. |
| Willard, Harold F., | Leominster, | 18 South College. |
| Winn, Ervin Lawrence, | Holden, | 87 Pleasant Street. |

Total, 47.

### Junior Class.

| | | |
|---|---|---|
| Ackerman, Arthur John,[1] | Worcester, | 7 South College. |
| Beals, Carlos Loring, | Sunderland, | Chemical Laboratory. |
| Beers, Rowland Trowbridge,[1] | Billerica, | 20 South College. |
| Bent, William Richard, | Marlborough, | 2 North College. |
| Bodfish, Edward Hill, | West Barnstable, | 6 Phillips Street. |
| Boland, Eric Nichols, | South Boston, | 13 Fearing Street. |
| Brett, Alden Chase,[1] | North Abington, | 2 South College. |
| Brown, Merle Raymond, | Greenwich Village, | 92 Main Street. |
| Burr, Frederick Huntington,[1] | Worthington, | 16 North College. |
| Caldwell, Lawrence Sanborn,[1] | Lynnfield Center, | 5 North College. |
| Carpenter, Jesse, Jr.,[1] | Attleborough, | 9 North College. |
| Castle, Fred Arlo, | Kansas City, Mo., | 13 South College. |
| Clapp, Raymond Kingsley, | Westhampton, | 16 North College. |
| Curran, Daniel Joseph, | Marlborough, | Lover's Lane. |
| Dee, John Francis, | Worcester, | Lincoln Avenue, at Mrs. Spear's. |
| Deming, Winfred Griswold, | Wethersfield, Conn., | 15 Fearing Street. |
| Dodge, Albert Wesley, | Wenham, | 13 North College. |
| Eisenhaure, John Louis,[1] | North Reading, | – – |
| Ells, Gordon Waterman,[1] | Haverhill, | Walker's House. |
| Fagerstrom, Leon Emanuel,[1] | Worcester, | 1 North College. |
| Fisherdick, Warren Francis, | Amherst, | 26 South Pleasant Street. |
| Fitts, Frank Orus,[1] | North Amherst, | R. J. Goldberg's. |
| Fitzgerald, John Joseph, | Holyoke, | 33 Elm Street, Holyoke. |
| Fowler, George Scott,[1] | Wayland, | 44 Pleasant Street. |
| Frost, John Newton,[1] | Natick, | 77 Pleasant Street. |

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[1] Work incomplete.

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| Gallagher, James Andrew, | North Wilmington, | 25 Lincoln Avenue. |
| Gaskill, Lewis Warren, | Hopedale, | Experiment Station. |
| Gelinas, Louis Edmond,[1] | North Adams, | 14 North College. |
| Gibbs, Robert Morey, | Chester, | Walker Hall. |
| Gibson, Lester Earl,[1] | Melrose, | 6 Maple Avenue. |
| Gray, Frank Leonard, | East Boston, | 21 Fearing Street. |
| Hallowell, Royal Norton, | Jamaica Plain, | Mathematical Building. |
| Hamblin, Stephen Francis, | Marston Mills, | 44 Triangle Street. |
| Hammond, Arthur Augustus,[1] | Wallingford, Conn., | Phi Gamma Delta House. |
| Harlow, Joseph Alvin, | Turners Falls, | 5 North College. |
| Heald, Jay Morrill, | Watertown, | 2 North College. |
| Hemenway, Thomas, | Winchester, | West Experiment Station. |
| Hickey, Francis Benedict, | Brockton, | C. S. C. House. |
| Hills, Frank Burrows, | Bernardston, | 8 South College. |
| Holland, Henry Lucius, | Amherst, | 28 North Prospect Street. |
| Hutchings, Herbert Colby,[1] | South Amherst, | 13 North College. |
| Kingsbury, Arthur French, | Medfield, | Chemical Laboratory. |
| Lamson, Robert Ward, | Amherst, | 51 Pleasant Street. |
| Lin, Dau Yang, | Shanghai, China, | 21 Fearing Street. |
| Lodge, Charles Albert,[1] | Manchester, | 85 Pleasant Street. |
| Lloyd, Edward Russell,[1] | Boston, | 25 Lincoln Avenue. |
| Madison, Francis Spink, | East Greenwich, R. I., | Veterinary Laboratory. |
| Martin, James Francis, | Amherst, | 19 South East Street. |
| McGarr, Thomas Anthony,[1] | Worcester, | 3 North College. |
| Merkle, George Edward,[1] | Amherst, | East Street. |
| Merrill, Fred Sawyer, | Danvers, | 85 Pleasant Street. |
| Moreau, Theodore Joseph, | Turners Falls, | 10 South College. |
| Müller, Alfred Frederick,[1] | Jamaica Plain, | 3 North College. |
| Noyes, Harry Alfred, | Marlborough, | Chemical Laboratory. |
| O'Flynn, George Bernhard,[1] | Worcester, | 75 Pleasant Street. |
| Parker, Ralph Robinson, | Malden, | C. S. C. House. |
| Pearson, Charles Cornish, | Arlington, | 14 South College. |
| Peckham, Curtis, | Clifford, | C. S. C. House. |
| Philbrick, William Edwin, | Taunton, | 14 South College. |
| Pierpont, John Edward, | Williamsburg, | C. S. C. House. |
| Pratt, Marshall Cotting, | Holderness, N. H., | Kappa Sigma House. |
| Puffer, Stephen Perry, | North Amherst, | North Amherst. |
| Raymond, Arthur Nathaniel, | Leominster, | 79 Pleasant Street. |
| Reed, Robert Edward,[1] | Abington, | Theta Phi House. |
| Robinson, Earle Johnson,[1] | Hingham, | 8 South College. |
| Rockwood, Lawrence Peck, | Waterbury, Conn., | 116 Pleasant Street. |
| Sanctuary, William Crocker, | Amherst, | Mill Valley. |
| Sellew, Lewis Raymond, | Natick, | Brooks Farm. |
| Shaw, Ezra Ingram, | Amherst, | 8 Spaulding Street. |
| Southwick, Benjamin Gilbert, | Buckland, | 8 North College. |
| Stack, Herbert James, | Conway, | Plant House. |
| Terry, Leon, | Springfield, | 8 Walnut Street. |
| Torrey, Ray Ethan, | North Leverett, | East Pleasant Street. |
| Tower, Daniel Gordon, | Roxbury, | 15 South College. |
| Tupper, George Wilbur,[1] | Jamaica Plain, | 85 Pleasant Street. |
| Turner, Howard Archibald, | Dorchester, | Plant House. |
| Wales, Robert Webster, | North Abington, | Kappa Sigma House. |
| Walker, Herman Chester,[1] | Marlborough, | Walker Hall. |
| Warner, Roger Andrew,[1] | Sunderland, | 4 North College. |
| Weaver, William Jack, | Alandar, | 10 Allen Street. |
| Whitney, Charles Everett, | Wakefield, | Walker's Hall. |
| Wilbur, Emory Sherman, | East Wareham, | Plant House. |
| Wilde, Earle Irving, | Taunton, | 9 North College. |
| Williams, Edward Roger,[1] | Concord, | 1 North College. |
| Williams, Silas, | Fall River, | Theta Phi House. |
| Wood, Howard Holmes,[1] | Shelburne Falls, | 15 South College. |
| Young, Edwin Burnham,[1] | Dorchester, | 8 North College. |

Total, 87.

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[1] Work incomplete.

### SOPHOMORE CLASS.

| | | |
|---|---|---|
| Adams, Winford Frederic,[1] | East Leverett, | 2 Allen Street. |
| Allen, Harry Willis, | Amherst, | Amherst. |
| Anderson, Oscar Gustaf, | East Pepperell, | Entomological Laboratory. |
| Angier, Harris William, | Westborough, | 88 Pleasant Street. |
| Baird, Harry Albert,[1] | Somerville, | Bungalow, Lover's Lane. |
| Baker, Dean Foster, | New Bedford, | Walker Hall. |
| Baker, Horace Mitchell, | Selbyville, Del., | Kappa Sigma House. |
| Barber, George Ware, | Franklin, | 120 Pleasant Street. |
| Barstow, Harold Dunbar,[1] | Hadley, | 84 Pleasant Street. |
| Birdsall, Webster Jennings,[1] | Otego, N. Y., | 6 Maple Avenue. |
| Blake, Ralph Cedric,[1] | Wollaston, | President's House, M. A. C. |
| Borden, Ralph James, | Fall River, | Phillips Street. |
| Bradley, John Watling,[1] | Groton, | Theta Phi House. |
| Brewer, Charlesworth Herbert,[1] | Mt. Vernon, N. Y., | 85 Pleasant Street. |
| Brown, Herbert Augustine, | Saxonville, | 79 Pleasant Street. |
| Bullard, Alvan Henry, | South Framingham, | 5 McCellan Street. |
| Burby, Lawrence Walter,[1] | Chicopee Falls, | Theta Phi House. |
| Bursley, Harold Barrows, | Peabody, | Theta Phi House. |
| Caldwell, David Story, | South Byfield, | Brooks Farm. |
| Carver, John Stuart, | Roslindale, | 85 Pleasant Street. |
| Chun, Woon Young,[1] | Shanghai, China, | 90 Pleasant Street. |
| Clark, Norman Russell, | Worcester, | College Store. |
| Clegg, Frank Jackson, | Fall River, | C. S. C. House. |
| Cobb, Joseph Boyd,[1] | Chicopee Falls, | 84 Pleasant Street. |
| Cole, Arlin Tower,[1] | West Chesterfield, | 44 Triangle Street. |
| Cole, Flora Atwood, | Watertown, | Draper Hall. |
| Coleman, Isaac,[1] | Amherst, | 12 North College. |
| Cooper, Everett Hanson, | Greenwood, | Walker Hall. |
| Cory, Harold, | Rutherford, N. J., | 82 Pleasant Street. |
| Covill, Joseph Warren,[1] | West Roxbury, | 7 South College. |
| Cristman, Clyde Edward, | Dalton, | 44 Triangle Street. |
| Curtis, Harold William, | Belchertown, | Belchertown. |
| Dayton, James Wilson, | South Norwalk, Conn., | 25 College Street. |
| Dooley, Thomas Patrick, | South Boston, | 35 East Pleasant Street. |
| Drury, Lewis Floyd, | Rutland, | 120 Pleasant Street. |
| Edminster, Albert Franklin, | Brooklyn, N. Y., | Mount Pleasant. |
| Ellis, Benjamin Ward, | Plymouth, | Clark Hall. |
| Fay, Robert Sedgwick, | Monson, | 84 Pleasant Street. |
| Forbush, Wallace Clifford, | Rutland, | R. J. Goldberg's. |
| French, James Dudley, | Hyde Park, | 116 Pleasant Street. |
| Gaskill, Ralph Hicks, | Amherst, | 15 Hallock Street. |
| Godvin, Thomas Joseph,[1] | Jamaica Plain, | 75 Pleasant Street. |
| Goodnough, Henry Edward,[1] | Wilbraham, | Kappa Sigma House. |
| Gore, Harold Martin, | Wollaston, | 11 South College. |
| Greenleaf, George Freeman,[1] | Brockton, | 21 Fearing Street. |
| Griffin, William Gerald, | South Hadley Falls, | 35 East Pleasant Street. |
| Griggs, Frederick David, | Chicopee Falls, | 84 Pleasant Street. |
| Guild, Louis Franklin,[1] | Swanton, Vt., | Thompson House. |
| Harris, Burton Adams,[1] | Wethersfield, Conn., | 66 Pleasant Street. |
| Hasey, Willard Harrison, | Brockton, | C. S. C. House. |
| Hatch, Herbert Tilden, | Norwell, | East Experiment Station. |
| Hayden, William Vassall,[1] | Beverly, | Walker Hall. |
| Headle, Herbert Wallace, | Bolton, | Mrs. L. H. Taylor's. |
| Headle, Marshall, | Bolton, | Mr. Lewis Howard's. |
| Holden, James Loomis, | Palmer, | 5 McCellan Street. |
| Howe, Glover Elbridge, | Marlborough, | 11 North College. |
| Howe, Ralph Wesley, | East Dover, Vt., | 116 Pleasant Street. |
| Hubert, Benjamin Franklin, | White Plains, Ga., | 48 Mount Pleasant Street. |
| Huntington, Samuel Percy, | Lynn, | Kappa Sigma House. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Hutchison, Robert B.,[1] | Somerville, | 11 Phillips Street. |
| Hyland, Harold Wilson,[1] | Weymouth, | Kappa Sigma House. |
| Jenney, Herbert Hedge, | South Boston, | 116 Pleasant Street. |
| Jones, Harold Frederick, | Campello, | 120 Pleasant Street. |
| Jordan, Simon Miller, | Rutherford, N. J., | Walker's House. |
| Kelley, Albert Joseph, | Roxbury, | 75 Pleasant Street. |
| Kelley, Bernard Jenkins, | Harwich, | 116 Pleasant Street. |
| Kenney, Frederick Alfred, | Charlestown, | 77 Pleasant Street. |
| Lake, James Edward, | Fall River, | 5 McCellan Street. |
| Lane, William Francis, | Leominster, | Phillips Street. |
| Larsen, Nils Paul, | Bridgeport, Conn., | Clark Hall. |
| Lesure, John Warren Thos., | Lunenburg, | 94 Pleasant Street. |
| Little, Willard Stone, | Newburyport, | 120 Pleasant Street. |
| Lowry, Quincy Shaw,[1] | Canton, | Kappa Sigma House. |
| Lyon, Harold, | Somerville, | 116 Pleasant Street. |
| Macone, Joseph Augustine,[1] | Concord, | 116 Pleasant Street. |
| Mallett, George Alfred, | Bridgeport, Conn., | Walker Hall. |
| Marsh, Frank Eugene,[1] | Jefferson, | Experiment Station Barn. |
| Matz, Julius,[1] | Boston, | 112 Pleasant Street. |
| Mayer, John Lawrence, | South Boston, | 35 East Pleasant Street. |
| McDougall, Allister Francis, | Westford, | Brooks Farm. |
| Moir, William Stuart, | Boston, | 35 North Prospect Street. |
| Murray, Joseph Wilbur, | Holyoke, | 75 Pleasant Street. |
| Neal, Ralph Thomas, | Mattapan, | 120 Pleasant Street. |
| Nichols, Norman Joseph, | Everett, | Mrs. L. H. Taylor's. |
| O'Brien, James Leo, | Wayland, | The Bungalow, Lover's Lane. |
| Packard, Clyde Monroe, | Springfield, | 96 Pleasant Street. |
| Parsons, Robert, | Lynn, | 44 Triangle Street. |
| Pease, Lester Newton, | Meriden, Conn., | 84 Pleasant Street. |
| Pellett, John Doubleday,[1] | Worcester, | 20 North College. |
| Pillsbury, Joseph James,[1] | West Bridgewater, | 8 South Prospect Street. |
| Post, George Atwell,[1] | Richmond Hill, N. Y., | Theta Phi House. |
| Prouty, Roy Henry,[1] | Worcester, | Walsh's House. |
| Putnam, Earl Francis,[1] | Easthampton, | 5 McCellan Street. |
| Roberts, Clarence Dwight,[1] | New Haven, Conn., | 10 Allen Street. |
| Roehrs, Herman Theodore, | New York, N. Y., | 83 Pleasant Street. |
| Rosebrooks, Walter Edwin, | Millbury, | Care of Mrs. Tripp, East Pleasant Street. |
| Samson, Stuart Dodge, | Grand Isle, Vt., | Kappa Sigma House. |
| Selden, John Lincoln,[1] | Northampton, | 3 McCellan Street. |
| Serex, Paul, Jr., | Jamaica Plain, | 75 Pleasant Street. |
| Sheehan, Dennis Anthony, | South Lincoln, | Walker Hall. |
| Shute, Carl August,[1] | Hampden, | 120 Pleasant Street. |
| Streeter, Charles Marsh, | Brimfield, | R. J. Goldberg's. |
| Thayer, Clark Leonard, | Enfield, | 77 Pleasant Street. |
| Tucker, Waldo Guy, | Lynn, | 19 Pleasant Street. |
| Tupper, Arthur Somerville, | Roxbury, | 85 Pleasant Street. |
| Van Zwaluwenburg, Reyer Herman, | Rutherford, N. J., | East Experiment Station. |
| Walker, Charles Dexter,[1] | Greenwich Village, | 120 Pleasant Street. |
| Wells, Nathan Holmes,[1] | Kennebunk, Me., | Care of Mrs. E. W. Smith, North Prospect Street. |
| Whitney, Francis Wellington, | Needham, | 15 Hallock Street. |
| Zabriskie, George, 2d, | Rutherford, N. J., | Pleasant Street. |

Total, 110.

### Freshman Class.

| | | |
|---|---|---|
| Abbott, Leslie Elmer, | Sandwich, | Brooks Farm. |
| Allbee, Gerard Osias, | Medway, | Mount Pleasant, care of Ora Samuel Gray. |
| Allen, Carl Murdough, | Holyoke, | 3 Fearing Street. |
| Anapolsky, Morris, | Boston, | 8 Walnut Street. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Anderson, Leslie Oscar, | Concord, | 55 Pleasant Street. |
| Baker, Melville, | West Medford, | Campion's, Pleasant Street. |
| Besser, Sidney Stokes, | Gilbertville, | Brooks Farm. |
| Bickford, Horace Mann, | East Braintree, | 116 Pleasant Street. |
| Bittinger, Fritz John, | Plymouth, | 120 Pleasant Street. |
| Blackhall, Allan John, | Brookline, | 17 Fearing Street. |
| Bokelund, Chester, | Worcester, | 31 East Pleasant Street. |
| Bragg, Ralph Stanley, | Milford, | Mount Pleasant. |
| Brewer, Harold William, | Mount Vernon, N. Y., | Care of Mrs. Dyer, Phillips Street. |
| Brooks, Arthur Winslow, | New Bedford, | Brooks Farm. |
| Brown, Harry Dunlap, | Lowell, | 82 Pleasant Street. |
| Caldwell, Delmont Leo, | Dorchester, | 6 Nutting Avenue. |
| Calvert, Melville Bradford, | New London, Conn., | 58 Pleasant Street. |
| Chapon, Robert Henri, | Bangor, Me., | 83 Pleasant Street. |
| Christie, Edward Wheeler, | North Adams, | 29 Lincoln Avenue. |
| Clark, Ernest Samuel, Jr., | Tolland, | 96 Pleasant Street. |
| Clay, Harold Johnson, | Cambridge, | 21 Fearing Street. |
| Coe, Alfred Lynn, | New York, N. Y., | Mrs. L. H. Taylor's, North Amherst. |
| Cole, Herbert Elmer, | Three Rivers, | 120 Pleasant Street. |
| Coleman, David Augustus, | South Framingham, | 29 McCellan Street. |
| Culley, Frank Hamilton, | Marshalltown, Ia., | 30 North Prospect Street. |
| Damon, Samuel Reed, | Kingston, R. I., | 77 Pleasant Street. |
| Davies, Lloyd Garrison, | Peabody, | 3 McCellan Street. |
| Davis, Ralph Edward, | Southbury, Conn., | 77 Pleasant Street. |
| Davis, William Ashmun, | Sunderland, | Care of E. H. Forristall. |
| Dearing, Newton Howard, | Brookline, | 11 Cottage Street. |
| Demond, Robert Norton, | Stafford Springs, Conn., | Care of E. H. Forristall. |
| Dexter, Evans King, | Mattapoisett, | 31 East Pleasant Street. |
| Dunbar, Erving Walker, | North Weymouth, | 5 Sunset Avenue. |
| Dunne, Robert Ernest, | New York, N. Y., | 17 Kellogg Avenue. |
| Earle, Henry Weston, | Roxbury, | 108 Pleasant Street. |
| Edgerton, Almon Morley, | West Springfield, | Nutting Avenue. |
| Edmonds, Sidney Wilfred, | Roslindale, | 60 Pleasant Street. |
| Edwards, Edward Clinton, | Salem, | 15 Cottage Street. |
| Elder, William Arthur, | Irvington, N. Y., | 56 Pleasant Street. |
| Eldridge, Harold Lockwood, | Wareham, | M. A. C. Grounds. |
| Farrar, Stuart Kittredge, | Springfield, | 35 East Pleasant Street. |
| Foster, Stuart Brooks, | West Somerville, | 16 Pleasant Street. |
| Freeborn, Stanley Barron, | Marlborough, | 116 Pleasant Street. |
| Freedman, Samuel Leavitt, | Roxbury, | 13 East Pleasant Street. |
| Frost, Robert Theodore, | New York, N. Y., | Care of Mrs. Dyer, Phillips Street. |
| Frye, Carl Raymond, | South Hadley Falls, | East Pleasant Street. |
| Gare, Edward John, | Northampton, | 101 Pleasant Street. |
| Gibson, David Wyman, | Groton, | Care of Mrs. L. H. Taylor's, North Amherst. |
| Graves, Benjamin Robert, | Northampton, | 58 Pleasant Street. |
| Grebin, Mark Anthony, | North Hadley, | North Hadley. |
| Hadfield, Harold Frederick, | North Adams, | 29 Lincoln Avenue. |
| Handy, Ralph Ellis, | Cataumet, | Brooks Farm. |
| Harriman, Vincent Spaulding, | Brockton, | 19 Hallock Street. |
| Harris, Rodney Wells, | Wethersfield, Conn., | 66 Pleasant Street. |
| Haskell, Willard Anderson, | Greenfield, | Pleasant Street. |
| Hazen, Edward Leonard, | Springfield, | Care of E. H. Forristall. |
| Hebard, Emory Blodgett, | Southbridge, | 3 Fearing streets. |
| Heffron, Fred, | Sherborn, | 47 Pleasant Street. |
| Higgins, Edward William, | Arlington, | 79 Pleasant Street. |
| Hogg, Lawrence Jagger, | Lawrence, | 9 Phillips Street. |
| Howard, Louis Phillips, | North Easton, | 82 Pleasant Street. |
| Hutchinson, John Gouvernour, | Arlington, | 79 Pleasant Street. |
| Hutchinson, Raymond Ernest, | South Hanson, | 52 Pleasant Street. |

| | | |
|---|---|---|
| Ingham, Earl Morris, | Granby, | 6 Nutting Avenue. |
| Jacobs, Loring Humphrey, | Wellesley, | 9 Fearing Street. |
| Jewett, Henry Dana, | West Newton, | Pleasant and Fearing Streets. |
| Johnson, Bernhard Pol, | Boston, | Walker's House. |
| Johnson, Rollin Eugene, | Templeton, | 14 Kellogg Avenue. |
| Jones, Dettmar Wentworth, | Melrose, | Care of Mrs. Dyer, Phillips Street. |
| Keyes, Pearl Pease, | North Amherst, | North Amherst. |
| Kilbourn, Walter Goss, | South Lancaster, | 82 Pleasant Street. |
| Kriebel, Addison Reiff, | Norristown, Pa., | Thompson House. |
| Leach, Benjamin Robert, | Methuen, | 79 Pleasant Street. |
| Leete, Richard Fowler, | Mount Kisco, N. Y., | 79 Pleasant Street. |
| Lemoine, Albert Zepherin, | South Framingham, | – – |
| Levine, Henry Walter, | Roxbury, | 13 East Pleasant Street. |
| Lewis, John Kirby, | New Haven, Conn., | 58 Pleasant Street. |
| Lincoln, Murray Danforth, | North Raynham, | 82 Pleasant Street. |
| Lucas, Hoyt Dennis, | West Springfield, | 6 Nutting Avenue. |
| MacDonald, Daniel Alfred, | Walpole, | 79 Pleasant Street. |
| MacHale, William Edward, | Jamaica Plain, | – – |
| Mahan, Harold Butteworth, | Hingham, | 3 McCellan Street. |
| Major, Joseph, | Rutherford, N. J., | 58 Pleasant Street. |
| McNiff, Owen Augustine, | Harvard, | 52 Pleasant Street. |
| Melloon, Ralph Reid, | Lowell, | Mount Pleasant. |
| Merkle, Frederick Grover, | Amherst, | East Street. |
| Morrison, Harold Ivory, | Melrose, | 66 Pleasant Street. |
| Morse, Harold John, | Townsend, | Brooks Farm. |
| Munroe, Donald Mitchell, | Huntington, N. Y., | 101 Pleasant Street. |
| Murray, John Kane, | Winthrop, | 14 Kellogg Avenue. |
| Needham, Lester Ward, | Springfield, | Care of E. H. Forristall. |
| Nicolet, Tell William, | Fall River, | 17 Fearing Street. |
| Nicolet, Theodore Arthur, | Fall River, | 17 Fearing Street. |
| Nicoll, William, | Glen Cove, N. Y., | 101 Pleasant Street. |
| Nissen, Harry, | Roslindale, | 13 Fearing Street. |
| Norton, Leslie Howard, | Brockton, | 19 Hallock Street. |
| Oertel, John Thomas, | South Hadley Falls, | Walker Hall. |
| Palmer, John Philip, | Portsmouth, N. H., | 79 Pleasant Street. |
| Parker, Edwin Kenney, | Northampton, | 5 McCellan Street. |
| Parker, Ervine Franklin, | Poquonock, Conn., | 96 Pleasant Street. |
| Payne, Roland Alfred, | Wakefield, | North Amherst. |
| Peters, Chester Harry, | Brown Station, N. Y., | 11 Cottage Street. |
| Petersen, Peverill Oscar, | Concord, | 55 Pleasant Street. |
| Pigott, Edgar Royston, | Winthrop, | 14 Kellogg Avenue. |
| Porter, Bennett Allen, | Amherst, | R. D. 1, No. 25, Amherst. |
| Powers, Richard Henry, | Malden, | Walker Hall. |
| Presley, Fred Young, | Malden, | Pleasant Street. |
| Priest, Roger Alexander, | Littleton, | 15 Fearing Street. |
| Read, Frederick William, | Boston, | 75 Pleasant Street. |
| Rees, Harry Launcelot, | Monson, | 3 Fearing Street. |
| Reid, George Alexander, | Worcester, | 58 Pleasant Street. |
| Robinson, Herbert Calvin, | Haverhill, | Walker Hall. |
| Russell, Alden Hesseltine, | Watertown, | 16 Pleasant Street. |
| Sahr, Gabriel Arthur, | Boston, | 30 North Prospect Street. |
| Sanford, Clarence Higgins, | Allston, | 3 Fearing Street. |
| Sexton, George Patrick, | Allston, | Brooks Farm. |
| Shaylor, Fred Wright, | Lee, | 120 Pleasant Street. |
| Sherman, Joel Powers, | Hyannis, | Walker Hall. |
| Sherman, Milton Francis, | South Lincoln, | 17 Kellogg Avenue. |
| Shirley, John Newton, | South Duxbury, | 30 North Prospect Street. |
| Simmons, George Walker, | Boston, | 116 Pleasant Street. |
| Slein, Owen Francis, | New Braintree, | Brooks Farm. |
| Small, Francis Willard, | North Truro, | 12 Hallock Street. |
| Smart, Herbert Leighton, | Framingham, | 15 Hallock Street. |
| Smith, Leone Ernest, | Leominster, | 44 Pleasant Street. |
| Smith, Leon Edgar, | Brighton, | 13 Fearing Street. |

| | | |
|---|---|---|
| Spencer, Ray Silsby, | West Burke, Vt., | 79 Pleasant Street. |
| Stevens, Arthur Eben, | Brockton, | 109 Main Street. |
| Stewart, George Osborn, | Somerville, | 79 Pleasant Street. |
| Strange, Sarah Josephine, | Marshfield, | Draper Hall. |
| Taft, Carl Mather, | Mendon, | 15 Hallock Street. |
| Taft, Richard Craig, | Oxford, | 75 North Pleasant Street. |
| Talbot, Rolfe Henry, | Brockton, | 5 McCellan Street. |
| Tarbell, Munroe Gifford, | Brimfield, | R. J. Goldberg's. |
| Taylor, Arthur Wright, | Feeding Hills, | Nutting Avenue. |
| Taylor, Leland Hart, | Peabody, | 3 McCellan Street. |
| Thurston, Arthur Searle, | Everett, | 9 Fearing Street. |
| Tower, Alfred Leigh, | Sheffield, | North Pleasant Street. |
| Tsang, Oong Hyuen, | Shanghai, China, | 26 Lincoln Avenue. |
| Upton, Ernest Franklin, | Salem, | 15 Cottage Street. |
| Walker, Nathaniel Kennard, | Malden, | 83 North Pleasant Street. |
| Walker, Raymond Philip, | Taunton, | 120 Pleasant Street. |
| Ward, Talbot, | Hyde Park, | 11 Cottage Street. |
| Warner, Raymond Winslow, | Sunderland, | Care of E. H. Forristall. |
| Webster, Louis Armstrong, | Blackstone, | 15 Hallock Street. |
| Weigel, Arthur George, | Lawrence, | 79 Pleasant Street. |
| Wheeler, Chester Eaton, | Lowell, | 79 Pleasant Street. |
| Wheeler, Warren Gage, | Dedham, | 56 Pleasant Street. |
| Whidden, Burton Clark, | Waltham, | 79 Pleasant Street. |
| Whippen, Charles Warren, | Lynn, | 79 Pleasant Street. |
| White, Samuel Alexander, | Boston, | 19 Fearing Street. |
| Whorf, Paul Francis, | Dorchester, | Brooks Farm. |
| Williams, George Edmund, | Belchertown, | Belchertown. |
| Wing, John Govan, | Somerville, | Brooks Farm. |
| Wood, Henry Joseph, | Mendon, | 15 Hallock Street. |
| Wooley, Harold Curtis, | Malden, | 83 Pleasant Street. |
| Wright, Frank Vernon, | Salem, | 79 Pleasant Street. |
| Young, Royal Bosworth, Jr., | Roxbury, | 108 Pleasant Street. |

Total, 160.

### UNCLASSIFIED STUDENTS. — NOT CANDIDATES FOR A DEGREE.

| | | |
|---|---|---|
| Churchill, George Clarence, | Worcester, | 15 Beston Street. |
| Critchett, Edward Russell, | Watertown, | Mount Pleasant. |
| DeMott, Henry Vroom, | Metuchen, N. J., | 2 Allen Street. |
| Eager, Samuel Warner, | Deerfield, | 120 Pleasant Street. |
| Edwards, Charles Richmond, | Northampton, | – – |
| Gilmore, Howard Pool, | Waban, | 3 Allen Street. |
| Granger, Helen, | Amherst, | Draper Hall. |
| Greene, William Allan, | Elmwood, | Mount Pleasant. |
| Hall, Horace Whitney, | Newton Center, | Pleasant Street. |
| Leonard, Larnie, | Talladega, Ala., | 48 Pleasant Street. |
| Lynch, Frank John, | Holyoke, | 75 Pleasant Street. |
| O'Brien, Daniel William, | Wayland, | Lover's Lane. |
| Phelps, Benjamin Austin, Jr., | Northampton, | 79 Pleasant Street. |
| Reed, Waldo Burt, | Springfield, | 11 Beston Street. |
| Selkregg, Edwin Reimund, | North East, Pa., | 17 Fearing Street. |
| Sibley, Milton Lawrence, | Worcester, | – – |
| Sohier, Fred Martin, | Concord, | 26 McCellan Street. |

Total, 17.

## SUMMARY BY CLASSES.

| | | |
|---|---|---|
| Graduate students, | | 15 |
| Senior class, | 47 | |
| Junior class, | 87 | |
| Sophomore class, | 110 | |
| Freshman class, | 158 | |
| Unclassified, | 17 | |
| | | 419 |
| | | 434 |

## GEOGRAPHICAL SUMMARY.

| | |
|---|---|
| Massachusetts, | 367 |
| Connecticut, | 17 |
| New York, | 18 |
| New Jersey, | 7 |
| Rhode Island, | 2 |
| Maine, | 2 |
| New Hampshire, | 3 |
| Vermont, | 6 |
| Delaware, | 2 |
| Pennsylvania, | 2 |
| Georgia, | 2 |
| Alabama, | 1 |
| Iowa, | 1 |
| Missouri, | 1 |
| China, | 3 |
| Japan, | 1 |
| | 434 |

# SHORT COURSES.

# SHORT COURSES — 1910.

## Winter Course Students.

Alcock, James Richard, North Amherst.
Baggs, Milton Charles, Belchertown.
Bahsler, Eugene, Dunstable.
Barnes, Joseph C., Lanesborough.
Belknap, Robert Sidney, Amherst.
Bowditch, John P., Framingham.
Bowser, Lydia Animia, Cohasset.
Bradstreet, Albert C., Topsfield.
Canlett, Thomas Griffith, Rockport.
Clark, Emerson Leland, Milford, Conn.
Channing, Hayden, Sherborn.
Childs, Samuel Wellington, Deerfield.
Cordes, Edward, Great Barrington.
Cox, Harold Childs, Wakefield.
Curtis, Elliot D., Bantam, Conn.
Day, Harry Ney, West Stockbridge.
Dow, Aaron William, Bolton.
Dunn, Howard Waterman, Dorchester.
Eastwood, John Robert, North Adams.
Edmands, Thomas Roland, Newton.
Gage, Earl Lyman, Gilbertville, N. Y.
Gray, George Arthur, Beverly.
Harris, George Browning, North Adams.
Holcomb, Edmund Alfred, Simsbury, Conn.
Hurd, Robert Otis, Westminster.
Kenney, Ralph Hewes, Greenwich, N. Y.
Ketchen, Harold Barnett, Belchertown.
Killam, John, East Boxford.
Koch, Mrs., Mabel Tyler, Bloomfield, Conn.
Lanier, Sidney, Walpole.
Lemoine, Arthur Alfred, South Framingham.
Lewis, Albert, East Rockaway, N. Y.
Marsh, Howard Clifton, Arlington.
Maurer, Frank Julius, Newton.
McCarroll, Edward Loomis, Waban.
McIntyre, George Henderson, Easthampton.
O'Donnell, James Curran, Belchertown.
Pardee, Edwin Curtis, Bolton.
Pease, Willard Morris, Monson.
Peck, Harold Frederick, Belchertown.
Perham, John Franklin, Ludlow Center.
Priest, Frederick Stimpson, Watertown.
Puffer, Willis Reynolds, Concord.
Sabine, George Kraus, Jr., Brookline.
Sanderson, Leon Benjamin, Williamsburg.
Scace, William, Pittsfield.
Scott, Edwin Gould, Garfield, Wash.
Searle, Edward, Southampton.
Seaver, John Dwight, New Britain, Conn.
Selkregg, Edwin Reimund, North East, Pa.
Shaughnessy, Thomas Francis, Marlborough.
Smith, John Anderson, South Westport.
Smith, Ralph Gibbs, North Amherst.
Supple, Mark Wellman, South Deerfield.
Thompson, Paul Ellis, Brookline.
Torrey, Lewis Edwin, Southbridge.
Urann, Carl B., Sullivan, Me.
Valentine, Francis Wadsworth, Boston.
Valentine, Richard Kirk, Erie, Pa.
Vetter, Rudolf, North Andover.
Walker, Elbert Lionel, Savoy Center.
Walker, Rena Lillis, Savoy Center.
Warfield, Preston George, Buckland.
Wheeler, George Oscar, Hudson.
Young, Earl Leonard, South Hadley.

Total, 65.

## Poultry Keepers' Course.

Barnes, Joseph C., Lanesborough.
Barnes, J. Edward, Athol.
Bradley, Miss A. J., Boston.
Chapin, E. C., Holyoke.
Chase, L. B., Sunderland.
Childs, Irving H., Deerfield.
Childs, Prentis B., Waltham.
Clement, Ralph, Richmond.
Coulson, S., Cambridge.
Crisand, Carl, Worcester.
Day, H. I., West Stockbridge.
Day, Irving N., South Hadley.
Dearden, James, Massachusetts.
Dixon, Enslo S., Roxbury.
Follett, Mrs. E. F., Boston.
Fox, Harry M., Dracut.
Heard, J. G., Dover.
Hitchcock, C. N., Amherst.
Holcomb, E. A., Simsbury, Conn.
Howards, Mrs. H. J., New York, N. Y.
Hutchinson, Wm. F., Sutton.
Johnson, C. W., Southborough.
Kendall, Mrs. H. I., Hadley.
Ketchen, Harold B., Belchertown.

Lanier, Sidney, Walpole.
Lawrence, Susan M., East Northfield.
Lupien, Israel A., Barre.
Martin, Henry L., Marblehead.
Mendum, S. W., Amherst.
Merrian, Etta L., East Northfield.
Merrick, Dr. Sara N., Cambridge.
Newton, Ward H., Athol.
Osgood, Champion, Cohasset.
Paine, Ralph D., Ludlow.
Perry, Lawrence, Hingham.
Terry, Leon, Springfield.
Priest, Frederick, Watertown.
Robinson, G. F., Somerville.
Sanderson, Leon B., Williamsburg.
Sias, Arthur E., East Boston.
Snell, Lewis P., Greenwich, N. Y.
Soderborn, G. O., New Bedford.
Stearns, John Warren, Sharon.
Thomas, Alfred C., Lawrence.
Tower, Eva L., Northfield.
Vetter, Rudolf, North Andover.
Walker, Elbert L., Savoy Center.
Whaley, James Sidney, East Orange, N. J.
Whitcomb, R. H., Amherst.
Whitney, J. C., Newbury.
Young, Earl L., South Hadley.

Total, 51.

### Beekeepers' Course.

Allen, G. H., Amherst.
Browning, C. P., Orange.
Burnett, Mrs. Harriet C., Natick.
Chapin, Annie M., Melrose.
Fleury, Joseph, Huntington.
Gowans, Ethel, Hampton, Va.
Graves, Charles, Haydenville.
Heath, Mrs. Alice, Auburndale.
Ives, Henry E., Westhampton.
Lawrence, Susan M., East Northfield.
Martin, J. O., Wilbraham.
Martindale, Gerald, Amherst.
Maud, Lawrence C., Bristol.
Morse, Josephine, South Lancaster.
Mulligan, Mrs. Minna, Natick.
Murch, Mary E., Melrose.
Schmitz, Eugene, Greenwich, Conn.
Sherman, Lillian A., Amherst.
Torrey, E. T., Southbridge.

Total, 19.

### Summer School Students.

Abercrombie, Rev. R. H., Windsor.
Adams, Faneuil, Brookline.
Adams, Lena R., Worcester.
Adams, Rebecca, Brookline.
Allen, Mary E., Worcester.
Allen, Thomas, Belchertown.
Allis, Abbie L. G., Amherst.
Ames, Fisher, Brookline.
Ames, Rosalie, Brookline.
Ayer, Addie M., Richford, Vt.
Ayer, Elizabeth P., Newport, R. I.
Bailey, Ethel M., Lancaster.
Baker, Florence M., Amherst.
Ball, Minnie, Amherst.
Beckwith, Fanny Leigh, Plainfield, N. J.
Belcher, S. Elizabeth, Worcester.
Bigelow, Lucy M., Amherst.
Boinstein, Sarah, New York, N. Y.
Boinstein, Pauline, New York, N. Y.
Boyer, M. Elmer, Lynn.
Brandow, Melvin, Plymouth.
Brandow, Mrs. Melvin, Plymouth.
Britt, Emma, South Boston.
Bromley, Mae H., Dorchester.
Brooks, Laura J., Stoneham.
Brown, S. Crissy, Stamford, Conn.
Burdick, Catharine Stevens, Newport, R. .
Burgess, Louisa W., Dorchester Center.
Burrage, Ruth Kilburn, Medford.
Butcher, Gertrude, Boston.
Carruth, Frank E., Cohoes, N. Y.
Chapman, Christine, Springfield.
Channing, Hayden, Sherborn.
Charlton, Emanuel C., Heath.
Chase, Rev. L. B., Sunderland.
Cheney, Hazel Chase, Amherst.
Clark, Doris, North Amherst.
Clark, Katherine, North Amherst.
Clark, Ruth Zilpha, Amherst.
Cochrane, A. L., Boston.
Cole, Albert S., North Dartmouth.
Cooledge, Kate A., Boston.
Cota, Florence L., Worcester.
Cox, Edward J., Newtonville.
Cox, Eleanor L., Newtonville.
Cox, Isabella L., Newtonville.
Cox, John E., Newtonville.
Crook, Charles M., Saundersville.
Crooks, Mrs. Charles M., Saundersville.
Cushman, Elizabeth, Harvard.
Cushman, Martha A., Harvard.
Cushman, Esther C., Providence, R. I.
Daly, Margaret, Brushton, N. Y.
Damon, E. Farnham, Concord Junction.
Davies, Rev. D. F., Plainfield.
Davis, Helen, Amherst.
Davis, Helen I., Lynn.
Davis, Lillian E., Boston.
Davis, Marjorie, Sterling.
Day, George Willis, Lynn.

Day, Mrs. George W., Lynn.
Derrick, Rev. Thomas H., Wellfleet.
Downing, Florence E., Everett.
Drinker, Florence L., Brooklyn, N. Y.
Drinker, Minnie F., Brooklyn, N. Y.
Eastman, Laura M., Winchendon.
Edds, Rev. Wm. T., Sag Harbor, N. Y.
Edwards, Arthur C., Bolton.
Eltzholtz, John W., Jacksonville, Ill.
Evans, Mr. E. R., Atlanta, N. Y.
Fay, Louise, Waltham.
Firmin, Mrs. M. A., Medford.
Ford, James, Cambridge.
Ford, Mrs. James, Cambridge.
France, William, Duxbury.
Fruean, Mary A., Dorchester Center.
Gage, Lucy Helen, West Medford.
Gardner, Adaline A., East Boston.
Gifford, Mrs. Alice B., Amherst.
Goodrich, Martha A., South Boston.
Goodnow, Edna M., Amherst.
Gould, Ella F., Brockton.
Graham, Carrie C., New Haven, Conn.
Granger, Helen, Amherst.
Graves, C. Edward, Hatfield.
Gurney, Florence W., ————.
Gurney, Ida B., Marion.
Haffenreffer, August, Jamaica Plain.
Hall, F. Josephine, Waltham.
Hall, Ida Estelle, Waltham.
Harding, Burchan, Mrs., New York
Hardon, Henry C., Newton.
Harrington, Clara B., Montague.
Harris, Mabel Everett, Cambridge.
Hayward, Lewis F., Holyoke.
Hawthorne, Elizabeth S., Dorchester.
Henizen, Henriette M., New York, N. Y.
Hersey, George Milbank, Boston.
Hewes, Elizabeth, Cambridge.
Hogan, Teresa G., Taunton.
Holbrook, Ella M., Dover.
Honnay, Agnes, Amherst.
Honnay, May, Amherst.
Hough, Helen, Northampton.
Howard, Clara B., North Amherst.
Howard, Effie B., North Amherst.
Howell, Lawrence D., Princeton, N. J.
Hubbell, George W., Rochester, N. Y.
Hudson, Cora L., Lock's Village.
Hurd, Mrs. William D., Amherst.
Hutchings, Frank F., Amherst.
Ivey, Rev. John L., Amherst.
Jenkins, Elizabeth, Northampton.
Jenks, Chas. F., Canton.
Jones, Frederick W., Providence, R. I.
Joplin, Flora Yeaton, Haverhill.
Joplin, Josephine M., Hampton, N. H.
Kelley, James P., New York, N. Y.
Kennedy, H. Anna, South Weymouth.
King, Emma H., Boston.
Knightly, Agnes E., Amherst.
Knight, Albert D., New Boston.
Knight, Howard Lawton, Washington, D. C.
Knight, Mrs. Howard Lawton, Washington, D. C.
Lathuner, Hugh, Stryker, O.
Lawler, Margaret E., Amherst.
Learnard, Mrs. Maude B., Newton Center.
Lindsey, Mrs. J. B., Amherst.
Loomis, Herbert Norton, New Britain, Conn.
Lyman, Harriet E., Boston.
Macmahon, Abbie D., Lyndhurst, N. J.
Macmahon, Arthur Whittier, Lyndhurst, N. J.
Macaumber, Clarrissa W., Boston.
March, Mrs. Clara I., Sherborn.
March, Mrs. Emily M., Arlington.
Margetts, Rev. H. G., Angelica, N. Y.
Martin, Elizabeth L., Southbridge.
Martin, John O., Southbridge.
Mattson, Mrs. W. F., Brookline.
Mayo, Stella W., Waltham.
McAfee, French, Port Royal, Pa.
McClenaghan, Rev. S. J., Jamesburg, N. J.
McKnight, Rev. William C., Nottingham, Pa.
Mellor, William H., Waltham.
Merrill, Evan W. D., Somerset.
Merrill, Mrs. Mary E., Somerset.
Miller, E. Cyrus, Hadenville.
Milliken, Fanny Lord, Malden.
Monk, Mrs. H. A., Stoughton.
Morgan, Edith, Amherst.
Morrison, Rev. T. Maxwell, Bellona, N. Y.
Morrison, Mrs. T. Maxwell, Bellona, N. Y.
Moulton, Ada E., North Hampton, N. H.
Mudge, Rev. W. L., Lewiston, Pa.
Murray, Florence H., Cambridge.
Neal, Josephine B., Taunton.
Newhall, Laura L., South Boston.
Nichols, Norman J., North Amherst.
Nickerson, Frances L., Amherst.
Norris, Rev. Thomas F., Plympton.
O'Connor, Mary E., Taunton.
O'Donnell, Miss N. T., Bridgeton, N. J.
Page, Effie M., Dorchester Center.
Page, Florence, Minot.
Paine, Bernard L., West Barnstable.
Parris, Mrs. Clara Howland, Dorchester Center.
Parsons, Elisabeth, Cleveland, O.
Pierpont, Rev. John, Williamsburg.
Piper, Elizabeth B., Cambridge.
Plumb, Sarah H., Amherst.
Polk, Samuel, Colora, Md.
Pool, Lena B., Lynn.
Poore, Harriet P., Boston.
Poore, Mary E., Brockton.
Post, Jessie L., Gilead, Conn.
Pousland, Annie E., Salem.
Prescott, Carl F., Quincy.
Quint, Harry, Roxbury.
Radlo, Dora A., North Adams.
Reymann, Anna, Cambridge.
Riggs, Ezra J., North Carver.
Robinson, Mrs. Alice M., South Boston.
Robinson, Emma C., Mount Vernon, N. Y.
Robinson, Mary B., Waltham.
Roberts, Fanny E., Brooklyn, N. Y.

Robertson, Rev. Wm., Sandwich.
Rowe, Mildred, Amherst.
Sanford, Lewis W., Lincoln.
Sayre, H. Bradley, Geneva, N. Y.
Schmidt, Richard H., Bridgeport, Conn.
Seymour, Florence C., Winsted, Conn.
Seymour, Mary F., Winsted, Conn.
Scribner, Celia A., Boston.
Sherman, Lillian A., Amherst.
Shumway, Ruth, Amherst.
Smith, Ethel M., Amherst.
Smith, Mr. H. W., North Haven, Me.
Southwell, Etta E., Brooklyn, N. Y.
Spaulding, Rev. Arthur, Salem, N. Y.
Spofford, Ellen W., Georgetown.
Springer, Lydia J., Boston.
Stanley, Dorothy, Amherst.
Stevens, Clara E., Boston.
Stevens, M. Dora, New Haven, Conn.
Stone, Mrs. James S., South Framingham.
Sullivan, Nellie L., Three Rivers.
Swett, Ethel S., Beverly.
Swing, M. Ella, Bridgeton, N. J.
Tapley, W. Thorpe, Revere.
Tobin, Ellen C., Lawrence.
Towne, Mary E., Amherst.
Turner, Mable E., North Reading.
Vauthier, Mr. L. P. F., Halifax.
Walden, Margaret C., Deerfield.
Watkins, Fred H., Gilbertsville.
Waugh, Dorothy, Amherst.
Webber, Mrs. Josephine R., Waltham.
Webber, Winona, Newton.
Wheeler, Mildred L., Taunton.
Wheelock, Mr. H. M., Dorchester.
White, Laura Bradstreet, Brighton.
Whitney, Joseph T., Medford.
Wight, Edith A., Waltham.
Williams, Mabelle E., Amherst.
Wilson, Warren H., New York.
Winder, John H., Jr., Coppahosic, Va.
Winn, Annah, Westfield, N. J.
Wo, S. P., Amherst.
Yang, Y. O., Amherst.

Total, 227.

## SUMMARY OF SHORT COURSES.

### *Winter Course Students.*

| | | | |
|---|---|---|---|
| Massachusetts, | 53 | Maine, | 1 |
| Connecticut, | 5 | Washington, D. C., | 1 |
| New York, | 3 | | |
| Pennsylvania, | 2 | | 65 |

### *Summer School Students.*

| | | | |
|---|---|---|---|
| Massachusetts, | 173 | Washington, D. C., | 2 |
| New York, | 20 | Illinois, | 1 |
| Connecticut, | 8 | Maine, | 1 |
| New Jersey, | 8 | Maryland, | 1 |
| Rhode Island, | 4 | Vermont, | 1 |
| Pennsylvania, | 4 | | |
| New Hampshire, | 2 | | 227 |
| Ohio, | 2 | | |

### *Poultry Course.*

| | |
|---|---|
| Massachusetts, | 47 |
| New York, | 2 |
| Connecticut, | 1 |
| New Jersey, | 1 |
| | 51 |

### *Beekeepers.*

| | |
|---|---|
| Massachusetts, | 18 |
| Virginia, | 1 |
| | 19 |

## UNREGISTERED ATTENDANTS.

### *Rural Conference of Social Workers.*

| | | | |
|---|---|---|---|
| Massachusetts, | 289 | Colorado, | 1 |
| New York, | 13 | Ohio, | 1 |
| Connecticut, | 11 | Maryland, | 1 |
| New Jersey, | 5 | Rhode Island, | 1 |
| New Hampshire, | 4 | Maine, | 2 |
| Vermont, | 4 | Illinois, | 2 |
| Pennsylvania, | 4 | | — |
| Washington, D. C., | 3 | | 341 |

### *Farmers' Week.*

| | | | |
|---|---|---|---|
| Massachusetts, | 533 | California, | 1 |
| Connecticut, | 9 | Montana, | 1 |
| Maine, | 4 | Michigan, | 1 |
| Rhode Island, | 3 | New Mexico, | 1 |
| New York, | 3 | | — |
| New Hampshire, | 2 | | 559 |
| Vermont, | 1 | | |

### *Correspondence Courses.*

| | |
|---|---|
| Massachusetts, | 360 |

# SECRETARIES OF ALUMNI ASSOCIATIONS AND CLASSES.

Alumni Secretaries' Association of the Massachusetts Agricultural College.
*Secretary:* Ralph J. Watts, 1907, Amherst, Mass.

Associate Alumni of the Massachusetts Agricultural College.
*Secretary:* Sidney B. Haskell, 1904, Amherst, Mass.

Local Alumni Association of the Massachusetts Agricultural College.
*Secretary:* Sidney B. Haskell, 1904, Amherst, Mass.

Alumni Club of Massachusetts.
*Secretary:* Herbert W. Dana (1899), Care of R. H. White Company, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
*Secretary:* Walter B. Hatch, 1905, Torrington, Conn.

Massachusetts Agricultural College Club of New York.
*Secretary:* John Ashburton Cutter, 1882, 262 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.
*Secretary:* Clarence H. Griffin, 1904, 3438 Mount Pleasant, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
*Secretary:* Charles A. Tirrell, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
*Secretary:* Thomas F. Hunt, 1905, Berkeley, Cal.

## *Class Secretaries.*

| Class of | SECRETARY. | Secretary's address. |
|---|---|---|
| 1871 | E. E. Thompson, | Worcester, Mass. |
| 1872 | S. T. Maynard, | Northborough, Mass. |
| 1873 | C. Wellington, | Amherst, Mass. |
| 1874 | – – | – – |
| 1875 | M. Bunker, | Newton, Mass. |
| 1876 | C. Fred Deuel, | Amherst, Mass. |
| 1877 | – – | – – |
| 1878 | C. O. Lovell, | 48 Summer Street, Boston, Mass. |
| 1879 | R. S. Swan, | Worcester, Mass. |
| 1880 | – – | – – |
| 1881 | J. L. Hills, | Burlington, Vt. |
| 1882 | G. D. Howe, | Bangor, Me. |
| 1883 | J. B. Lindsey, | Amherst, Mass. |
| 1884 | L. Smith, | 25 Mercantile Street, Worcester, Mass. |
| 1885 | E. W. Allen, | Washington, D. C. |
| 1886 | Dr. Winfield Ayres, | 616 Madison Avenue, New York, N. Y. |
| 1887 | F. H. Fowler, | Shirley, Mass. |
| 1888 | H. C. Bliss, | Attleborough, Mass. |
| 1889 | C. S. Crocker, | 25 South Van Pelt Street, Philadelphia, Pa. |
| 1890 | David Barry, | Amherst, Mass. |
| 1891 | H. T. Shores, | Northampton, Mass. |
| 1892 | H. M. Thomson, | Amherst, Mass. |
| 1893 | F. A. Smith, | Ipswich, Mass. |
| 1894 | S. F. Howard, | Amherst, Mass. |
| 1895 | H. A. Ballou, | Barbadoes, W. I. |
| 1896 | – – | – – |
| 1897 | C. A. Peters, | Moscow, Idaho. |
| 1898 | – – | – – |
| 1899 | D. A. Beaman, | Ponce, Porto Rico. |
| 1900 | E. K. Atkins, | Northampton, Mass. |
| 1901 | J. H. Chickering, | Dover, Mass. |
| 1902 | H. L. Knight, | 1731 T Street, Washington, D. C. |
| 1903 | G. D. Jones, | North Amherst, Mass. |
| 1904 | P. F. Staples, | North Grafton, Mass. |
| 1905 | P. F. Williams, | Auburn, Ala. |
| 1906 | Richard Wellington, | Geneva, N. Y. |
| 1907 | J. N. Summers, | Amherst, Mass. |
| 1908 | Jas. A. Hyslop, | 205 D Street, Washington, D. C. |
| 1909 | Charles S. Putnam, | Walpole, N. H. |
| 1910 | Henry T. Cowles, | Central High School, Santurce, P. R. |

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# FORTY-NINTH ANNUAL REPORT

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE.

## PART I.

REPORT OF THE PRESIDENT AND OTHER OFFICERS
FOR FISCAL YEAR ENDED NOV. 30, 1911.

MARCH, 1912.

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1911

# The Commonwealth of Massachusetts.

Massachusetts Agricultural College,
Amherst, Dec. 1, 1911.

To His Excellency Eugene N. Foss.

Sir: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part I. of the forty-ninth annual report of the trustees, for the fiscal year ended Nov. 30, 1911, this being the report to the corporation of the president and other officers of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
*President.*

# REPORT OF THE PRESIDENT OF THE COLLEGE.

*Gentlemen of the Corporation.*

I herewith submit my annual report as president of the Massachusetts Agricultural College.

Acting in accordance with a plan approved by the administrative officers of the college and by the trustees, the scope of the report has been considerably broadened. Each administrative officer has been asked to present a résumé of the year's work coming under his jurisdiction, a statement of immediate needs, and the suggestion of some fundamental problems. This material has been freely utilized, without particular credit, in the preparation of this report.

The report divides into three fairly distinct portions: —

1. A discussion of some fundamental problem of the college.
2. A review of the year.
3. A statement of immediate needs.

The report is followed by the usual data concerning students, gifts, etc., and by the annual report of the treasurer of the institution.

It is a part of the plan hereafter to discuss at some length in each annual report one or more of the fundamental problems which the college has to face. This year it seemed best to consider the general function, or mission, of the college.

## THE FUNCTION OF THE MASSACHUSETTS AGRICULTURAL COLLEGE.

After nearly forty-five years of active service by the college it may seem invidious, at first thought, to incorporate in a report of the president of the institution a discussion of its main purpose. So long a period of work must surely have revealed both the task of the college and the attitude of our people toward its service. But as "new occasions teach new duties" to individuals, so new conditions create new demands upon institutions, often call for new methods, and may even develop entirely new functions. There is no merit in change for its own sake; but change is pretty sure to be a concomitant of growth. Hence, from time to time the function of an educational institution needs restating if not reshaping. The excuse for introducing this subject in this report lies, therefore, in the belief that the time has come to plan large policies for the future in the light of a clear-cut modern statement of the fundamental purpose and task of the college.

An institution of education supported by the government gains its main purpose from four sources: first, from legislation; second, from the historic policy of the college itself; third, from the realization of some fundamental need of society, that may be met by the college; fourth, from the changing aspects of this fundamental need, as expressed in new demands for service, which in turn call for new methods and even new types of work.

The legislation which calls a college into existence is considered by some a sufficient statement of its purpose. The State laws incorporating the college utilized the Morrill act of 1862 for the purpose of stating the main work of the college. The Morrill act is, then, virtually the legal charter of the college. So we are repeatedly asked to read the Morrill act of 1862 for the statement of the work of this institution. From the legal point of view, the Morrill act is, and forever must be, the starting point from which the work of the college proceeds and spreads. Nevertheless, it cannot be considered a sufficient statement of the service demanded of this college by the present age. This is not to deny the value of the Morrill act; it is not to impugn its worth; it is not to repudiate its statements; it is simply to assert that with the lapse of time, the rise of new ideas, the need of adaptation to modern conditions, the Morrill act does not in itself, alone, give us the cue to the complete function of the college. Indeed, I question whether it was ever meant to do so.

It is sometimes stated that the Morrill act, in its definition of the work of the land-grant colleges, is clear and specific. I cannot agree with that statement. The law has actually been interpreted in such a way that the institutions based on the law have developed widely varied policies. They are all one in the emphasis on including preparation for the industrial vocations, but they are widely divided as to the scope of other work performed. It will not do to impugn the motives or the intelligence of those who have managed these institutions in such diverse ways. We have here simply an illustration of the possibilities of differing interpretations of the Morrill act. I think one of the finest compliments that can be paid to the act is to say that it was so broadly drawn that the States could adapt the work of their colleges to varied needs and ideals. But this fact again enforces the former statement that the unsupported language of the Morrill act itself is not to-day a sufficient guide for the total work of our own agricultural college.

Furthermore, we must remember that legislation itself is only an expression, and almost without exception an incomplete expression, of some need of society. Hence, a law like the Morrill act must be interpreted in terms of both the fundamental and the changing needs of those political units that furnish the funds for the support of the college thus called into existence. In other words, the needs of Massachusetts for to-day and to-morrow must help interpret the laws of yesterday, with respect to the work of this college.

It is almost impossible to conceive that a college can labor for forty-five years, with reasonable success, and yet be on the wrong track. Time itself, as well as experience, justifies policies. Hence precedents count for something, and we have no right to break with the past abruptly. Historic policies should never become swathes that bind us irrevocably to the past; they are rather foundations for our building which we may not safely disregard.

But, after all, the real test of the work of our college is neither a law nor an historic policy, but this: Is the college meeting the *need* of the people of the State? In other words, what is the social purpose of the college, its real excuse for existence? Why is the State still willing to pay the cost of its support? Why may we confidently argue for the continued investment, in equipment and maintenance, of such large amounts of the public funds?

And, finally, we must seek constantly to meet new issues as they arise and thus keep the college abreast the times.

The limits of this report forbid an exhaustive development of the four propositions just laid down as to the source of an authoritative policy. We may, however, give attention to a few preliminary considerations growing directly out of these propositions: —

1. The Massachusetts Agricultural College is a *college.* It is not a school. Governor Andrew, in his message to the Legislature of 1865, said, "I should deeply regret to see an institution which bears the name of Massachusetts, and will be held to be representative of the Commonwealth, especially of the highest aspirations of her yeomanry, allowed, for want of generous support, to degenerate into a mere industrial school." In spite of this statesmanlike utterance of nearly a half-century ago, we occasionally hear suggestions that the college is getting too far away from its constituency, and that in order to meet this constituency its standards of admission should be kept low. One cannot help sympathizing with the democratic notion that lies back of these sincere suggestions, but they are based upon the fallacy that a high grade of work will separate the college from its real task. As Governor Andrew so well said, this college represents the highest aspirations of the rural people of Massachusetts, and we can never admit that the highest aspirations of the rural people may be expressed in inferior scholarship. Without question, there is need of institutions of lower grade for the teaching of agriculture, but these should be provided, as Massachusetts has now so wisely ordered, through agricultural high schools and agricultural departments of public schools. But the agricultural college is the educational leader for the building of a highly developed rural civilization within the State.

Now the college is our most characteristic expression of such leadership. Emphasis upon the fact that this institution is a college calls, therefore, for college standards of admission and graduation, — college standards with respect to quality, though not necessarily with respect to subject matter. Within recent years the college has placed itself squarely in line with this policy, and now requires practically the same standards of admission as regards quality of work as are demanded by the typical New England college. We believe, also, as regards requirements for graduation, that, on the whole, the four years of work at the Massachusetts Agricultural College represent as good quality as will be found in the average college. Maintenance of college standards, therefore, of the college atmosphere, and of the college point of view must be our policy.

2. On the other hand, the Massachusetts Agricultural College is not, at present, a State university and, in my judgment, it ought not to be made a State university. It may seem idle to discuss this question. Nevertheless, nearly half of the institutions established under the Morrill act of 1862 are State universities. In Massachusetts we hear more or less said about the need of a State-supported university, and occasionally the suggestion is advanced that our college is the natural nucleus for such an institution. I do not purpose to discuss the question as to the need of a State university in Massachusetts, but I feel very strongly that it would be a great mistake to attempt to make a State university out of the Massachusetts Agricultural College. Its location is not favorable for such an institution. Its history and traditions are not in harmony with this form of development.

3. The Massachusetts Agricultural College is an *agricultural* college. This statement raises a question subsidiary but related to the idea of a State university. Practically all of the land-grant colleges which are not State universities have developed departments of mechanic arts, and many of them other branches of study. Our own college, all through its history, has given more or less attention to civil engineering. The general policy of the college at this point was, however, settled before the college opened for students, through a legislative arrangement by which the Massachusetts Institute of Technology secured a portion of the federal grant on the theory that the mechanic arts work should be given at the institute and agriculture at Amherst. The result of this legislation is that probably the Massachusetts Agricultural College is the only one of the land-grant colleges which may be called strictly an agricultural college. From time to time in its history suggestions have been made relative to broadening its scope beyond agriculture, emphasizing general science, etc. But I feel very keenly that we ought to emphasize now and forevermore the proposition that our college is an agricultural college and nothing but an agricultural college. I am aware that there are difficulties in carrying out this policy. The first thought that comes to mind when one speaks of an agricultural college is that its chief function is especially to train farmers. But we are located in an urban State. Many vocations which the college naturally fits for, like landscape gardening for instance, are followed in the city and not in the country, though even in landscape gardening

the work is so intimately bound up with the subject matter of agriculture that we are compelled to broaden our definition of agricultural education to include training of this sort. That statement leads us really to the heart of this whole matter: Gradually there is forming a new definition of agricultural education. The agricultural college should fit men for farming, but it is a question whether that is its chief mission. There is such an insistent call for trained men in various other forms of leadership in agriculture and country life that we cannot expect that all, or perhaps even a majority, of our graduates shall go directly to the farm. Apparently an increasing proportion of our graduates are going directly to the farm simply because they are beginning to find that they can be just as successful there as anywhere else, and because they like the independence of the farmer's life.

To put the matter in a nutshell, agriculture is broadening so rapidly, the need for trained men is developing so many new vocations, that if our college, in its research, in its teaching, in its extension work is to cover *adequately* the whole field of modern agriculture, it has a work to do which will tax to the utmost the skill of its faculty and the willingness of the Legislature to make appropriations. From the standpoint of public finance and policy, then, as well as from the standpoint of interior purpose and fundamental function, we must insist that the *Massachusetts* Agricultural College shall always be the Massachusetts *Agricultural* College.

4. Our people must also understand, and this is particularly true of the Legislature, that the Massachusetts Agricultural College is "a college of the Commonwealth." Its property is owned by the Commonwealth; its support has always come solely from the Commonwealth or the nation; its trustees are appointed by the Governor of the Commonwealth; it is answerable for its finances and its policies directly to the representatives of the Commonwealth; indeed, for all practical purposes its trustees are the agents of the Commonwealth. It is not a private institution. It has a public function. It grows only as public support for it grows. It is absolutely dependent upon the pleasure of the Commonwealth, or, if you please, upon the Legislature. We stand or we fall in accordance with the will of the people of the State.

I am sometimes asked why private individuals do not make endowments or gifts for the college. I suppose it is because of the fact just mentioned, that we are a college of the Commonwealth. I hope the time may come, however, when people of means will appreciate the tremendously significant problem which the college is set to solve, and the great difficulty of even a wealthy State like Massachusetts providing all the needs that arise in the development of an institution of growing numbers and importance. We have not only the problem of maintenance, but the problem of adequate buildings. At present we are dependent entirely upon the village of Amherst for the housing of the students. It is a serious question how far we may call upon the State to provide dormitories, not because it is not a legitimate call, but because we need other things. I wish it might be possible for dormitories to be built as the result of private gifts. There are many other uses to which private gifts could be put, and I hope that people who are interested in the development of the agricultural industry and rural life in Massachusetts can come to see that State support for the college may well be supplemented by private gifts for many good causes that are likely to be overlooked by the Legislature.

## Statement of Purpose of the College.

In the light of these observations, can we state in one sentence the real purpose and function of the college? May we not put it this way? The *Massachusetts Agricultural College is designed primarily to benefit the agriculture and rural life of Massachusetts, and incidentally that of the nation.* It is often said that Massachusetts is not an agricultural State, and it is perfectly true. But agriculture is, nevertheless, an important and significant industry, and the cities are coming to realize that its development means something for them as well as for the farmers. The farmers themselves are beginning to see that the more intensive forms of agriculture are the ones that pay the best, and it does not take much of a prophet to suggest that the characteristic feature of Massachusetts agriculture of the future is that it is to be an intensive agriculture. Now an intensive agriculture always means education. While the industry in Massachusetts may be relatively small, it is also relatively important, and calls for the very best type of agricultural education that American genius can evolve. Moreover, an effort to help Massachusetts agriculture must be designed to result not only in better farming, but in a more efficient distribution of soil products to consumers, as well as in better conditions of living, and in better rural communities. Now whatever an educational institution of college grade can do for such objects as these comprises the task of our college. Probably in practice it is a varying task, — one thing to-day, another thing to-morrow. But the one main purpose is expressed in the thought that the college is the organ, or servant, of the Commonwealth on behalf of Massachusetts agriculture and country life. "I serve" should be its motto; and this thought of service to the rural interests of Massachusetts and the nation should govern the policies of the college and pervade its atmosphere.

### How the Mission of the College may be achieved.

It will be necessary to leave for discussion in subsequent reports the details of methods by which this general function of the college may be realized. Space must be given here, however, to an outline of these methods, for they illustrate and enforce the main thesis or contention of this study.

There are three main types of service which the college may render: —

1. Investigation.
2. Instruction.
3. Extension service.

Investigation may be called the search for truth about agriculture and rural affairs; instruction, the incarnation of this truth in trained leadership; extension service, the dissemination or democratization of this truth, — its distribution among all the people interested.

Thus the college has a threefold task; not three tasks, but one task, to be fulfilled in these three fairly distinct methods or types of work. Let us discuss each one of these with as much brevity as possible.

Of course the characteristic work of this college, as of any college, is to teach the students who resort to it. But it is peculiarly true of an agricultural college that it cannot teach until it has something to teach. Hence, logically, the first business of the college is to investigate. It seems best, therefore, to place research first in the order of present discussion.

### *Investigation.*

There are laws governing the operations of soil and the growth of plants and animals. Experience and observation enable men to follow these laws to a degree, — but only to a degree. Few farmers have time for prolonged or systematic study or the training or facilities for it. Men must be set apart for this work, — men specially trained, with time and apparatus. Thus the agricultural experiment station came into being. This work of investigation divides itself into several types as follows: —

1. *Research.* — This is a study of the fundamental laws that underlie the operations of the soil and the growth of plants and animals. The aim of research in agriculture is to gain exact knowledge of general principles that may be applied to the business of growing food and other supplies coming from the soil.

2. *Experimentation.* — Once the general principles or laws are discovered, the method of their application to actual operations must be worked out. Expert farmers will accomplish a good deal of this experimentation, but not all of it. Hence, the college, through its experiment station, must continuously carry on these experiments.

3. *An Agricultural Survey.* — We now recognize the need of knowing not only the general laws of nature and their applications to methods of culture, but that each farmer needs to know how to make the application under his peculiar conditions of soil, climate, topography, market and transportation facilities, etc. It may be argued that it is not the business of the State to tell each farmer how to run his farm. That is true. But so long as there are unsolved problems lying before our farmers, which can be solved only in the light of the knowledge which the average farmer cannot gain for himself, then the college must help. We must remember that we are rapidly coming to a time when each acre of Massachusetts soil must be put to its best possible use, and the only satisfactory way of determining this best possible use is by experience based on scientific study of the conditions of that acre. Now, for want of a better term, we call the search for truth about these exterior and local conditions that surround the farmer at his work an "agricultural survey."

4. *The Economic Phase.* — Another need enters at this point

that calls for an enlargement of the scope of agricultural investigation. Production of crops and animals is only a hemisphere of the agricultural industry. These products are to be sold at a profit, if possible. At any rate, they are to be transported with economy and distributed where they are wanted, and the consumer must have them fresh and wholesome and at a price not prohibitive. Many factors enter into this problem of distributing the products once grown: the nearness to market, transportation, the character of the market, competition for the market, the function and rewards of the middlemen, the development of agricultural credit, business co-operation among farmers, etc. These economic considerations, just because they are vital to the success of agriculture, are a subject for thorough investigation by the agricultural college.

5. *The Social Phase.* — But, after all, there is an even larger issue. Our greatest concern is with the quality of people developed by the rural mode of living. Hence, the conditions of rural life — moral, religious, recreational, sociable — are of significance. So with the institutions of the rural community, — schools, churches, organizations, means of communication, — how do they do their work, how can they be improved? Just because these things, too, are vital to the welfare of the Commonwealth, they must be studied.

### *Instruction.*

We may now consider the methods by which the instruction of the college shall minister to its chief purpose. There are three main outcomes to be cherished in the course of study, and I state them in inverse order with respect to human destinies, but in direct order with respect to immediate purposes and policies. They are, first, preparation for the agricultural vocations; second, preparation for citizenship, particularly rural citizenship; third, the all-round development of the man.

*Preparation for the Agricultural Vocations.* — This is the immediate business of the college on the teaching side. The courses of study, the methods of teaching, the atmosphere of the institution, should all make for this end. The term "agricultural vocations" is, perhaps, somewhat misleading, but must answer until we find a better one. It is not the same as farming. The term does not imply that all of these vocations are pursued in the open country, but it includes those vocations the adequate preparation for which must embrace a thorough study of the soil, or of plants, or of animals, for the purpose of using that knowledge for economic ends; and also the vocations of a professional character which have to do directly with the life of the rural people. The men called for in these agricultural vocations may be grouped roughly as follows: —

(*a*) Independent farmers.

(*b*) Farming experts or managers.

(*c*) Specialists in agricultural practice or science, such as teachers and investigators and extension workers, employed in agricultural colleges, experiment stations, the United States Department of Agriculture, etc.

(*d*) Professional experts, such as landscape gardeners, foresters, and arboriculturists, who deal so intimately with agricultural materials that, although their vocations are not essentially rural vocations, the best training is found in connection with the agricultural teaching.

(*e*) Business experts in lines related to agriculture, such as the fertilizer business.

(*f*) Rural social engineering, that is, professions in which social service to the rural people is the keynote, such as teachers in agricultural high schools, country clergymen, rural Y. M. C. A. secretaries, etc.

It must be understood that this is only a rough grouping and, indeed, a tentative list. New vocations are developing constantly. Institutions other than agricultural colleges are taking on some of these lines of work. But in general this division indicates our goal; namely, that of the definite preparation of men for these fields of work.

*Training for Citizenship.* — The most efficient service to society which can be rendered by most men is the honorable pursuit of a useful vocation, and it becomes the fundamental task of the agricultural college to inspire its graduates with the thought that they are to follow their chosen vocation, not primarily as a means of making money, but primarily as a means of service to society. This may sound theoretical and academic, but it is sound sociology, sound pedagogy, sound ethics, sound religion.

Nevertheless, each individual has obligations to the community that lie outside his vocation. No matter how isolated his life may be, nor how busily he may be engaged in the exacting duties of his vocation, he is obliged by many considerations, not the least of which is his education at State expense, to give an intelligent and honest account of himself as a member of society, as a political citizen. It hardly needs arguing that the man who in college gives some attention to the problems of citizenship is thereby the better fitted to fulfil his obligations as a citizen. This is particularly true of those problems that have to do with local community life, — things that many college men regard as beneath them and of small consequence, and yet which are absolutely vital to the permanence of society. It is especially incumbent upon the man who follows his vocation in a rural environment that he shall understand the peculiar needs of the rural community as well as those larger general needs which incorporate themselves in State and national policies. The agricultural college, therefore, must try to make sure that every graduate has secured some grip both upon the problems of the rural community and upon the general problems of the day, — problems social, economic, governmental, ethical.

*The Man himself.* — Without question, the man must be greater than his work and perhaps even greater than his citizenship. But I think we have not yet sufficiently realized the possibilities of vocation in the making of a man, and hence we have not realized the culture-value of the training for vocation. As a matter of fact, those qualities of mind and character that we like to think of as belonging to the superior man, such as sound physical health, intellectual vigor, ripe culture, high ideals and noble thinking are cultivated, in no small degree, by the right sort of pursuit of the day's work and by the right sort of service to one's family, neighborhood, town, State and nation. I believe, therefore, that whenever we have organized our agricultural vocational courses in the proper way, whenever the materials of study in those courses have been adequately elaborated, and assuming that all the subjects are properly taught, we will find that the man thus trained, granted that he has within him the seeds of culture, will become a cultivated, well-rounded man.

More than knowledge of problems, greater than an interest in politics, is the *spirit* of community service, the willingness to sacrifice something of one's financial gains, of one's time and energy and leisure and comfort for the sake of leading one's community on to higher levels; for the sake of solving its problems.

An agricultural college cannot give its chief attention to the training of men for the utilization of their leisure. Leisure is important, even vital, to the ripening of a man's powers, but leisure is not the characteristic attitude of a leader, and that is what colleges are for primarily, — to train leaders. An agricultural college must train for efficient work and public service and not for leisure. Yet there is no reason why the men who follow the agricultural vocations may not have leisure. They must have it. Leisure feeds the highest impulses of the soul. Leisure is essential to the enlargement of the spirit. An agricultural college should have teachers and offer courses, and require men to take those courses, that will tend to give the individual student, no matter what his vocation, some grasp of the eternal verities, some hold on the essential things of life, some knowledge of the sources of personal power, great inspiration, a grip on the problems of human duty and human destiny. This may be secured through literature, or through philosophy, or through history; but we cannot afford to give the baccalaureate degree to any man who has not at least opened the door and peered into that high-vaulted chamber which contains the choicest treasures of human thought and aspiration.

### *The Extension Service.*

We come now to the third phase of the task of the college, — the dissemination of truth to all the people of the State. This task, perhaps, raises issues. There are those who deny that it is a primary function of an agricultural college. Some are willing to admit that the experiment station should send out bulletins describing its work and results, and that occasionally a professor should give a public lecture, but deny the task which is represented by the apt phrase of one of our own trustees, "the State is our class room." With respect to agriculture and rural matters the State of Massachusetts *is* our class room. I hold that the function of extension service on the part of the agricultural college is coordinate with its function of investigation and of teaching resident students, and the reason lies less in any logical formula than it does in a practical need and a practical means of meeting that need. What I mean is this: the ultimate purpose of the agricultural college is the benefit of the agriculture of the State. One means of benefit is investigation; another is by training leaders; but another, and, in some respects, the most important, is by reaching with information and inspiration every worker in the land. It is the logical outcome of the social, or State, function of the institution.

There are those who will say, "Very well, we admit the significance of the task but let the work be done by some other agency than the agricultural college." I reply, why *should* it be done by some other agency than the agricultural college? It is the one institution that investigates and discovers principles and facts about agriculture. It is the one institution that is training leaders and experts. It is the one institution to which the people of the State look for educational leadership in agriculture.

But there is a positive and very practical reason why the agricultural college should develop extension teaching. If that teaching is developed by any other agency in the State, it necessarily means duplication of agencies, because the kinds of teaching needed by the great masses of the people of the State are the kinds of teaching that are given in the college, and it would be unbusinesslike, uneconomic, and would lead to friction if a second institution should be developed with a large corps of workers specifically for the purpose of popular education in agriculture, but apart from the research, the teaching, the atmosphere and the inspiration of the agricultural college.

There are other minor reasons why the extension service should become organic in the agricultural college. It reacts on the research and teaching, bringing them into more intimate touch with the realities and the fundamental needs of agriculture and country life. It gives the institution that State-wide and social leadership which makes it the center of light and leading in agricultural affairs. The people themselves expect that the college shall distribute what it knows for the benefit of the people who cannot come to the college. The college has always done this sort of work to a degree, and its validity has never been questioned. Indeed, if the college were to deny its duty to perform this service, I venture the prediction that it would not be long before the people of the Commonwealth would refuse to support it. It is because they cherish the belief that the college exists to serve them directly and immediately, as well as through the training of a comparatively few individual leaders, that they are willing to pour out money in its behalf.

Obviously this extension service should be so organized that it shall not interfere with the work of research or of teaching. Temporarily, because of lack of men, it may have this bad effect, but this is only a passing phase and can be remedied as soon as we have adequate appropriations and can develop what shall practically be an extension service faculty.

## THE RELATIONSHIPS OF THE COLLEGE.

This discussion of the fundamental task of the Massachusetts Agricultural College leads to some observations concerning its relationship to other institutions of the Commonwealth which have tasks of a somewhat similar character.

### *The Public School System.*

If this were a State university of long standing it would without doubt be considered the crown of the public-school system. It is not a university, but a college for a specific purpose. Nevertheless, in so far as that purpose is germane to the general educational interests of the Commonwealth, to that extent the college finds its place in the system. For practical purposes this may not mean a great deal. The fact, however, ought to be generally recognized, particularly by the school authorities of the Commonwealth. On the part of the college this fact requires that our entrance requirements shall be of such a character that they fit as closely as possible the actual high school conditions that prevail in the major portion of the high schools. It may be remarked in this connection that there is no sound reason why, as is sometimes suggested, this college should fit itself to the smaller or to the less efficient high schools. Its obligation, rather, is to the great body of high school pupils. We have tried to carry out this principle, and the present entrance requirements were not adopted until they had been submitted to all the high school principals of the State, and a number of suggestions made by these principals were incorporated.

### *Relation to the Teaching of Agriculture in the Public High Schools.*

The Commonwealth has embarked upon a plan of developing, in systematic fashion, the teaching of agriculture in agricultural departments of public high schools, or in separate agricultural high schools or in both. It is evident that the task of administering the new plan lies wholly with the State Board of Education. On the other hand, the work of preparing teachers of agriculture must lie chiefly with the agricultural college, with, possibly, some co-operation from the normal schools of the State. This division of responsibility seems to be so clear that there is little need for enlarging on the principles thus laid down. There are, however, two phases of the situation that call for remark. There is a great deal that can be done in the way of agricultural education with young people still of school age and with the teachers, particularly the grade teachers, who are endeavoring to develop school garden work or some other form of elementary agricultural teaching. This is one feature of agricultural college extension teaching. In some States this work has been done by the State department of education, but it seems to me so clearly an extension-teaching function that I believe it ought to be developed by the State college of agriculture. For illustration, under the direction of Professor Hart some 19,000 boys and girls, during the season of 1911, grew corn and potatoes under the direction of the college. We do not claim that this work is as yet thoroughly organized; indeed, only a beginning has been made, but it ought to be encouraged and developed by the college, of course with the approval of the State educational authorities.

The other matter has to do with the general scheme for agricultural education in the public schools. The State Board of Education must take the responsibility for this plan because it is to administer it, but the ultimate plan itself ought to be the product of a very closely knit co-operative study, especially as it is pioneer work and there are so few American precedents to guide us.

### *Relationship to the Normal Schools.*

The extent to which the agricultural college and the normal schools may co-operate seems to be uncertain. The normal school stands essentially for training in principles of education and methods of teaching. The agricultural college stands primarily for the organization of the materials of agricultural education. Teachers of agriculture in high schools and special schools are clearly to be sought in the agricultural college. There would seem to be a call, also, for men trained in normal schools, who take a year or two at the agricultural college for positions in agricultural teaching of high school grade. It is doubtful whether many grade teachers who are endeavoring to give some agricultural work will take regular courses at the agricultural college. The attendance at our summer school of agriculture, however, seems to show that these teachers desire to supplement their normal school training with the more technical studies that are offered by the agricultural college.

### *Relationship to the State Board of Agriculture.*

During the past five years there has existed some slight misunderstanding as to certain relationships between the Board of Agriculture and the college. I think that this relationship is working itself out, and that a clearer understanding is already evident. I should like, in some future report or in some other public way, to discuss this matter more at length, but at this time merely suggest a valid general principle, which, if applied, would solve all our difficulties with respect to possible duplication of work. To put the matter in a word, I believe that the chief function of the agricultural college is educational and that the chief function of the Board of Agriculture is administrative. It is true that in the earlier days the Board of Agriculture had educational functions, but that was before the day of the agricultural college, or at least before facilities for widespread popular education by the college were developed. New conditions bring new work. Can we not, therefore, make this general principle our starting point for the enlargement, without any conflict or overlapping, of the work of both the Board of Agriculture and the college; namely, that administrative work, police work and control work belong primarily to the Board of Agriculture, and educational work belongs primarily to the agricultural college?

It may be thought that all this means the limitation of the work of the Board of Agriculture. I do not think so. All indications point to the fact that the government is going to play an increasingly larger share in our agricultural progress. The State government, therefore, through a board or department of agriculture, is sure to develop increasingly important and diverse functions. The administration of laws for the protection of the farmer, the offering of prizes and other means of stimulating agriculture and leadership, assistance by the State in solving such problems as the farm labor question, in developing schemes for business co-operation, and in other enterprises in which the government of the State is willing to play a part, belong not to the educational but to the administrative agency. On the other hand, wherever teaching is to be done, information to be given or educational forces to be invoked on behalf of the farmers, it would seem clear that the agricultural college is the natural center for such dissemination.

Of course, there are chances for some overlapping, even under the application of this principle. For example, the dairy bureau in enforcing laws finds that one of the most powerful aids to enforcement is simply teaching the people what is the right way to do. Therefore, as an incident of law enforcement, some educational propaganda is legitimate and even necessary. On the other hand, the extension men of the college frequently find opportunity for the definite work of organizing new enterprises in country communities as the natural outgrowth of the extension teaching. But if the general principle is adhered to, I see no real difficulty with respect to these apparent exceptions.

There are at least two pieces of work, which have been in operation for a long time, that clearly contravene this principle as at present administered. The Massachusetts experiment station is charged with the duty of enforcing the laws concerning fertilizers and feedstuffs. On the other hand, the State Board of Agriculture is charged with the management of farmers' institutes. In the one case, the college, through its experiment station, takes on police duties; on the other hand, the Board of Agriculture carries on a definite educational work. It seems to me, however, that there is no need for any misunderstanding here. Both of these means of work have been established so long and have become so thoroughly rooted in the respective fields in which they were planted that good judgment would dictate they should not be disturbed, at least for the present.

This frank discussion has been introduced not so much because there is danger of serious misunderstanding, but because the agricultural movement is going ahead so fast that the more closely we can tie the work together, and the more clearly defined the task of each agency, the better results we will get for Massachusetts agriculture. The principle of division of labor seems so simple and so clear that I venture to suggest it at this time in the hope that it may work out into a generally accepted plan of co-operative endeavor.

In so far as the State, through any other agency such, for instance, as the State Board of Health, enters the field of agriculture or country life, the same principle would hold; namely, that the State Board should assume the administrative function and the college should exercise the educational function. I speak of this particularly because I believe that the time will come when the whole question of rural sanitation ought to be made a very important feature of our agricultural propaganda, and I should like to see the agricultural college play a definite part in this very important matter.

### *The Relationship of the College to Voluntary Associations.*

The relationship of the college to voluntary associations designed to benefit agriculture and country life is, perhaps, of less interest as a matter of discussion, although it is of a great deal of importance practically. Take, for instance, the grange. The grange is very thoroughly a friend of the college, and we have made every effort to reciprocate by assisting the grange in its educational work whenever possible. The fundamental reason, however, for assisting the grange, or the village improvement society or any other local body is, that it is always sound policy for the college in its educational work to develop as little machinery as possible, and to seek to reach the people who need its help, whenever it can be done, through agencies already in operation. It is quite possible, for example, to work out a plan by which the grange and the college could co-operate in a very effective system of agricultural teaching, which would materially increase the efficiency of the college in reaching the people at their homes, and which would also manifold the educational work of the grange, this work being, of course, the dominant purpose of the grange.

In this connection I wish to call your attention to two remarkable actions recently taken by the Massachusetts State Grange. The grange has offered two scholarships in our winter school to successful contestants in the writing of essays on some agricultural topic. They are also taking steps to organize a large loan fund, from which loans may be made to young men and women belonging to the grange who have to pay their own way through college. While the benefits of this fund are not to be confined to students of the agricultural college, undoubtedly quite a proportion of these students will come to this college.

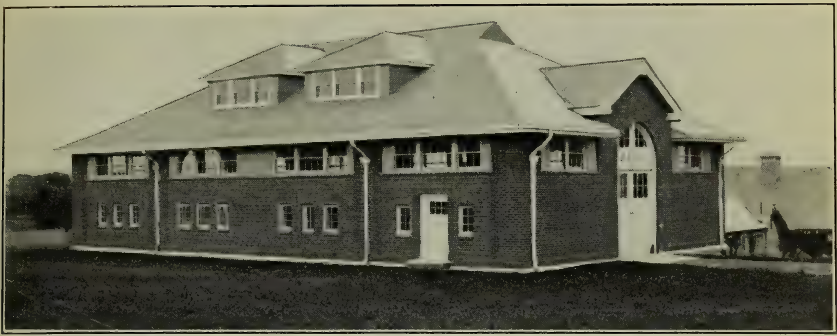
## A REVIEW OF THE YEAR.

### Attendance.

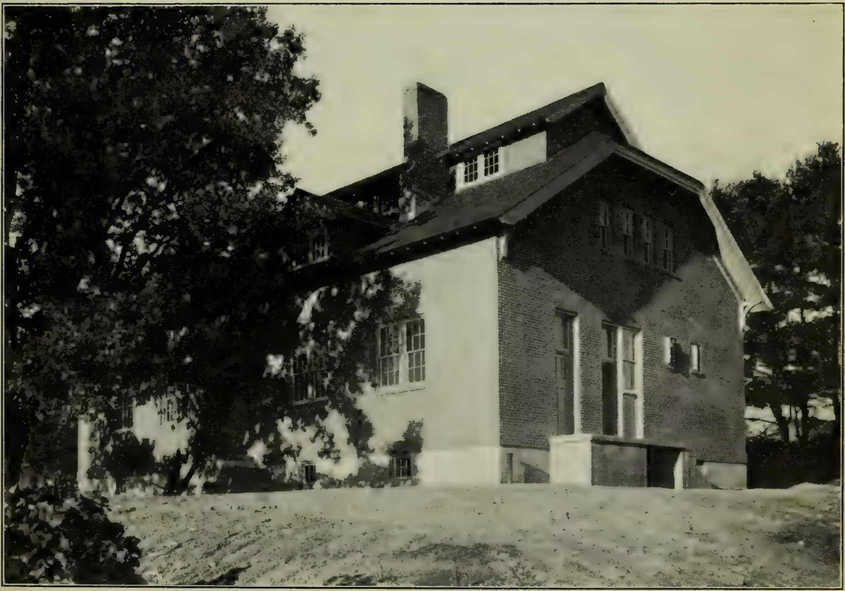
The attendance of students enrolled in the four-years course at this date is 477, an increase of 75 over the enrolment of a year ago. In addition to this enrolment of four-year men, there are 15 members of the graduate school and 29 students doing work of college grade, who are registered as unclassified students. Therefore, the total number of students doing work of college grade is 521 for the present year, a gain of 87 for the year. The entering class this fall numbered 168, an increase of 10 over the number entering last year. (See Table I.)

Nearly 87 per cent. of those entering this year come from Massachusetts; 5 other States send students and also 2 foreign nations. Every county in Massachusetts, with the exception of Nantucket, is represented in the present freshman class, Middlesex County sending the largest number, which is 36 or nearly 25 per cent. of the total number entering. (See Table V.)

Over one-fifth of the class are undecided as to their intended vocation; approximately one-third of the entire class express their intention of following some line of professional agriculture or horticulture as their life work; and about two-fifths more signify their intention of entering some vocation in practical agriculture or horticulture. Nearly 94 per cent. of those having made a decision, therefore, intend to follow an agricultural vocation. Less than one-fourth of the fathers of the members of the freshman class are engaged in agriculture or horticulture, and a little over one-fourth are business men. Approximately one-fourth of the class come from farms, and nearly two-fifths have had no farm experience whatever. The average age of the entering class is 19.17 years. (See Table V.)



Stock Judging Pavilion, Grinnell Arena, erected in 1910–11.



Fruit Storage Building and Laboratory, erected in 1910–11.

THE FLINT LABORATORY, M. A. C. — Dairy Building.

## APPROPRIATIONS.

The trustees presented to the Legislature in 1911 requests for special appropriations amounting to $192,500; of this amount, $122,500 was granted. An increase of $90,000 in current annual appropriations was asked, and had this been granted the total income from the State for this purpose would have been $232,000; the increase granted, however, was $34,500, making the total for the present year $176,500. (See Table II.)

The most important item granted in the special appropriations was that of $75,000 for a dairy instruction building and laboratory. Following is a brief description of the building: —

### *The New Dairy Building.*

The dairy building now under construction is to be known as the "Flint Laboratory," named in honor of the Hon. Charles L. Flint, fourth president of the Massachusetts Agricultural College. This building is the first of the proposed "agricultural group." The plan for this group makes a large agricultural building the central figure of the group, flanked by the dairy building on the west and a proposed farm mechanics' building on the east.

The dairy building will be 120 feet long, 62 feet wide, with a basement and two stories. The construction is "fireproof," being of reinforced concrete and brick with a slate and gravel roof. The partitions will be made of 4-inch terra-cotta blocks, with a hard cement plaster on each side. The finish will be smooth and sanitary. An 8-foot corridor will run the full length of the building on each floor. Large glass windows will be placed in the corridor walls so that the work being done in the different rooms can be seen to advantage from the corridor, without the visitors interfering in any way with the students.

The basement will contain a laundry, a locker room that will accommodate lockers for 150 men, a shower bath, a cheese manufacturing and a cheese curing room, storage rooms, and a dairy mechanics room, as well as a room with an artificial refrigerating plant. The refrigerating plant is designed to furnish refrigeration for the cold box or refrigerator, as well as to make artificial ice if desired.

The first floor will have two offices in the front, with the milk-handling laboratories back of them. A space 104 feet long by 24 feet wide on the north side of this floor will be given exclusively to the separating of milk, ripening of cream and making of dairy butter. On the south side will be found a complete market milk equipment, including a 16 by 16 foot refrigerator and a 27 by 24 foot ice cream manufacturing room. The refrigerator will be equipped in such a way that either artificial refrigeration or natural ice can be used.

The second floor will have an office and a department reading room. On this floor there will also be a dairy bacteriological laboratory that will accommodate 20 men at one time; a Babcock laboratory, 62 by 24 feet, that will accommodate 30 men; and a special feature in a dairy equipment museum, 57 by 24 feet, for which it is hoped a permanent exhibit of dairy apparatus may be obtained, as well as loans of "up-to-date" dairy appliances for exhibition during the time that the short-course students and farmers' week visitors are here. If this can be done the four-years men will have advantages along this line far above those ordinarily afforded.

This building is designed for instruction to meet Massachusetts dairy conditions, — market milk and farm dairy work. The laboratories will accommodate 100 men at one time if desired. This equipment, together with our certified milk equipment, which we will use even more in the future as a laboratory, will give the college, perhaps, the best college market milk equipment in the country.

## COMMENCEMENT.

The last annual commencement occurred June 21. At that time the college conferred the degree of B.Sc. on 43 men, the degree of M.Sc. on 2, and the degree of Ph.D. on 2. Eugene Davenport, dean of the College of Agriculture of the University of Illinois, gave the commencement address, taking for his subject, "The Agricultural College as a Public Service Institution." The attendance at the alumni dinner was 206, this being the largest number present on such an occasion in the history of the institution.

## SUMMER SCHOOL.

The registration in the summer school of 1911 was 153, a number considerably smaller than the registration of the preceding year. The comparatively small attendance was undoubtedly due to the fact that last summer the registration fee was raised from $1 to $5. Those attending the summer school, however, seemed to have come with serious and definite purposes, and, on the whole, the school was perhaps more satisfactory than those held in former years. Owing to lack of funds for enterprises of this sort, it has been decided to omit the summer school for 1912.

In connection with the last summer school there was held another conference of rural social workers. There were present at this conference about 250, representing the grange, the Y. M. C. A., the rural school, etc. In this connection there was also held an exhibit of rural social work, which was probably the first time that the exhibit idea had been applied to the sociological side of rural affairs on so large a scale. The usual course for rural clergymen was also included in the summer school.

## THE WINTER SCHOOL.

The attendance at the winter school of 1911 was 113. Previous to that the largest attendance had been 66. The poultry course, which was given during the last two weeks of the winter school, had a registration of 74. The winter school itself was concluded by a "farmers' week," which furnished a most admirable program and brought to the college 830 people, who came for a part or all of this four days' special instruction.

## TUITION FEE.

The trustees have voted to require a tuition fee of nonresidents of the State registering for work of college grade. Beginning next September, therefore, such students will be charged a fee of $40 a year.

## THE YEAR IN THE DEPARTMENTS OF INSTRUCTION.

*In General.* — During the year no radical changes have taken place in the method or scope of instruction. Perhaps the most significant improvement has come through the addition of a number of instructors in the required subjects of the freshman and sophomore years, made possible by the increased appropriations of one year ago. This has allowed the scheduling of relatively small sections. It is needless to say that, other things being equal, the teaching efficiency must be increased by this arrangement. A table is presented showing the numbers in the various sections of the required work of the freshman and sophomore years one year ago and the present semester.

| | 1910. | 1911. |
|---|---|---|
| Sophomore class: — | | |
| Enrolment, | 110.0 | 127 |
| Number of sections, | 4.0 | 6 |
| Average number in section, | 27.5 | 21 |
| Freshman class: — | | |
| Enrolment, | 158.0 | 168 |
| Number of sections, | 5.0 | 8 |
| Average number in section, | 31.6 | 21 |

*In the Division of Agriculture.* — The work in the division of agriculture has been strengthened materially during the year by the addition of the new men mentioned in another place in this report, and by the development of a number of new courses.

The new poultry department has been put on a sound footing; buildings have been erected and stock and equipment have been purchased. The demand for instruction in poultry husbandry, both by regular students of the institution and throughout the State, is very gratifying.

The work in animal husbandry has been considerably enlarged, and a new instructor taken on.

In the department of dairying much time has been devoted to the completion and perfection of plans for the new dairy instruction building.

The college farm has again shown an increase in sales without a corresponding increase in expenditure. It is the ambition of the division to make the farm entirely self-sustaining.

*In the Division of Horticulture.* — No important changes in the courses of study or teaching policy have been made during the year. Some changes in personnel are recorded in the statement regarding new appointments. Important plans are under way for additional experimental work, and interesting developments have been found in the plant breeding work. The greatest improvement in the physical equipment of the division has been the erection of the new cold-storage plant for use in the departments of pomology and market gardening.

*In the Division of Science.* — The various departments in the new division of science have been carried on without notable change, except with respect to the formal organization into a division.

The department of chemistry has been reorganized, and the research and teaching sides of chemistry are now under one head. The announced object of the department is (1) to give all students in the college a reasonable understanding of the general principles of chemistry in its application to agriculture; (2) to co-operate with other departments of the college so that students may have an understanding of chemistry in its particular relation to the other arts and sciences, such as agriculture, horticulture, botany, biology, entomology, etc.; and (3) to train students for positions as chemists in experiment stations, the United States Department of Agriculture, fertilizer and feed factories, in dairy work, sugar work and the like.

The department of entomology has completed one year of work in the new building, and finds the building excellently adapted to departmental needs. A new course in forest insects has proved popular, and additions to the teaching force have made possible a greater attention to graduate teaching.

The teaching force in the department of mathematics is now adequate to permit comparatively small sections and, in the judgment of the department, the efficiency of the freshman work has been thereby materially increased. The class in senior engineering is the largest ever taking that elective course since it was introduced.

The subject of physics has been given full departmental standing during the year, and justifies its place not only because of the importance of physics as a science in itself, but also because special emphasis is laid on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, and zoölogy, thus furnishing an extra tool by which the student's work in all these subjects may be made more effective.

The department of veterinary science has been enabled to develop the accessory work in bacteriology to a considerable degree on account of the addition of Dr. Gage to the teaching force.

*In the Divisions of the Humanities and Rural Social Science.* — The work in economics and sociology has been given prominence by the organization of a department, as is the case with rural sociology. Other than the addition of numerous courses in these two departments no radical changes have been made during the year.

### THE GRADUATE SCHOOL.

During the parts of the two college years covered by this report, 24 persons registered as graduate students. Of these, 19 were candidates for advanced degrees, the others taking such subjects as they desired, whether graduate or undergraduate in grade. Two were given the Ph.D. degree, and 2 the M.Sc. degree, at the last commencement. Seven persons presented themselves for the first time for graduate work this fall, making, with former students still at work, a total of 18 graduate students this fall. Of these, 3 are not candidates for advanced degrees.

No new policies have been initiated, the temporary organization of the school being such as to render these inadvisable. Despite this, one change should be made. The school was originally organized when no divisions of the college were in existence, and some of the present divisions were only departments. New departments in those divisions have not been recognized by the trustees in connection with graduate work, and the professors in charge of those departments feel that, in consequence, they are not on the same plane with other departments, and are not inclined to take graduate students so long as this inequality obtains. This seriously hampers the success of the graduate school, and I, therefore, recommend for the consideration of the trustees the following action taken by the faculty committee on graduate school: —

> Any department of the college, properly equipped and prepared to do so, may present to the committee on graduate school a full statement of the lines of work it is prepared to offer for graduate work, and on approval by the committee and endorsement by the trustees, such departments may be added to the list of those giving graduate courses, the rating of these courses as majors or minors for the degrees of M.Sc. or Ph.D. to be determined by the committee on graduate school.

The school is suffering at the present time from a lack of policies and advertising. A close, thorough organization of the work should be brought about; the scope of majors and minors determined more minutely; the latitude of choice of minors fixed; and the whole school pushed ahead more vigorously. I strongly recommend that steps be taken to give the school ample authority to develop in these and other directions.

## The Experiment Station.

A number of minor changes in the station staff have taken place during the year, which are recorded in another part of this report. There has been one important building change; namely, the repairs and improvements at the station laboratory. The entire building has been renovated, the plumbing much improved, and heat from the central plant introduced; two new laboratory rooms have been provided for research work, and a large room set aside for library and reading purposes. These improvements furnish temporary relief from the overcrowded and inconvenient conditions hitherto prevailing. A substantial building has been erected on the college cranberry bog near Wareham, with sufficient capacity to handle the entire crop, and to furnish laboratory and living rooms, at a cost of about $2,100.

The following publications have been made during the year: —

Twenty-third annual report, 451 pages.

Bulletins: Inspection of commercial fertilizers, 76 pages. Inspection of commercial feedstuffs, 56 pages (No. 136). Inspection of commercial feedstuffs, 32 pages (No. 139). Rational use of lime, 20 pages. Tomato diseases, 32 pages. Meteorological bulletins, twelve, 4 pages each.

Circulars: Rules relative to testing dairy cows, 6 pages. The chemical analysis of soils, 4 pages. Balanced rations for dairy stock, 7 pages. Lime and sulphur solutions, 4 pages.

Additional publications: six papers printed in Part I. of the annual report, and one from Part II., have been published as separates.

The mailing list has been thoroughly revised in co-operation with every postmaster in the State. Many names dropped on account of death, removal, etc. Total number dropped, 1,110. New names added, 1,291. Lists at present: —

| | |
|---|---|
| Residents of Massachusetts, | 12,903 |
| Residents of other States, | 2,567 |
| Residents of foreign countries, | 242 |
| Newspapers, | 519 |
| Libraries, | 317 |
| Exchanges, | 142 |
| Cranberry growers, | 1,400 |
| Beekeepers, | 2,880 |
| Meteorological, | 583 |
| Total, | 21,553 |

A digest of the main lines of work for the year will be of general interest: —

No very fundamental changes have been made in lines of work in progress, but in many instances inquiries have been considerably broadened in scope. This is especially true of the cranberry investigations, in connection with which arrangements have been completed for meteorological observations in connection with the United States Weather Bureau. Color vision of the honey bee is a new subject taken up during the year.

*Control Work.* — The passage of a new fertilizer law has been secured. This becomes operative December 1. Fertilizer samples collected during the year, 1,061.

*Feed Law.* — A new feed law has been prepared which will be introduced in the Legislature this winter. Samples collected and examined during the year, 731.

*Dairy Law.* — A new dairy law prepared last year failed of enactment. It will be reintroduced.

The work of testing pure-bred cows continues to increase. It employs the entire time of two men, while from three to five men are needed during about five months every year.

*Seed Work.* — Purity tests, 62; germination tests, 355; samples separated, 138.

### *Results of the Lines of Work in the Experiment Station.*

Although the report of the director of the station, printed as a separate document, should be referred to for all matters concerning details of the station work, it may not be out of place to recite some results which, in the opinion of the director, have been attained by the year's work and are of general public interest.

*Alfalfa.* — Both home and co-operative experiments in general, satisfactory. In interpreting significance of results it seems important to remember that the much better success than was obtained in earlier years may, perhaps, be connected with the comparatively small rainfall. Still, the outlook is regarded as hopeful.

*Asparagus.* — The substation work at Concord has made excellent progress in the direction of producing a rust-resistant variety.

In the fertilizer work it has been made very apparent that the tendency to rust has been reduced by such use of fertilizers (especially nitrate of soda) as is calculated to promote uniform steady growth.

*Cranberry.* — Crop of the year excellent and will sell for a total sum of about $4,800. This will leave in the neighborhood of $3,500 net proceeds above the cost of harvesting, packing, etc., which becomes available to help meet costs of experimental work.

Numerous important lines of experiment have been introduced. Among the more important are overhead sprinkling system in its relation to frosts, crop production, etc., fertilizer experiments; general investigation as to insects and relation of the honey bee to pollination.

Among the significant results of the year has been the demonstration of the great importance of the honey bee in insuring pollination.

*General Results in the Department of Agriculture deserving Special Mention.* — Demonstration that sulfate of potash is far superior to muriate as a source of potash for the raspberry and for alfalfa.

Demonstration that for the onion crop no combination of fertilizer employed in addition to stable manure at the rate of 30 tons per acre is beneficial.

Demonstration that for alfalfa and oats as a nurse crop the various forms of fine-ground bone and basic slag meal are superior to fine-ground rock phosphates as sources of phosphoric acid.

Remarkable improvement in the character of pasture sod, and great increase in production of feed as result of top-dressing with moderate amounts of slag meal and double sulfate of potash magnesia.

*Results in the Chemical Department.* — Experimental and research work considerably hindered by repairs in progress, and none of the subjects which engaged special attention has been brought to a conclusion.

*Results in the Horticultural Department.* — Careful study as to the climatic adaptations of apple varieties has been completed. This work shows the great importance of exact climatic adaptation and the meteorological principles upon which this depends. It will have an important practical application in fruit growing.

*Results in the Veterinary Department.* — Experiments in feeding milk from tuberculous cows to calves and young stock have been completed. None of the animals contracted tuberculosis.

## The Extension Service.

The extension service has had two full years of operation. It is needless to say that I regard this phase of our college activities as of the utmost consequence, directly to the Commonwealth and indirectly and incidentally to the college itself. I hope in a future report to discuss at some length the problem of an adequate extension service on behalf of Massachusetts agriculture and rural life. I now recommend that you authorize the publication of a fairly full report of the work of the past two years as a separate document. In the hope that this may be done, I will here simply call attention to a table of statistics of the extension activities printed as Table III. in another part of this report, and to a brief statement of results that I believe it is fair to credit to the work thus far accomplished.

### *What the Extension Service has accomplished.*

1. It has systematized the scattered work heretofore done by the several members of the faculty.

2. Through the various short courses thorough instruction has been given to several hundred people who could come to the college for but a short time.

3. Through the lectures, demonstrations, demonstration or-

chards, dairy improvement associations, traveling libraries, and personal visits to farms, trains, fair exhibits, extension schools and other similar activities, reliable information has been carried to thousands who could not come to the college for it.

4. Through the correspondence courses men and women have been able to pursue systematic study and still attend to business or professional duties.

5. By means of the summer school and the conference for rural social workers, teachers, clergymen and others concerned in building up the educational and social life of rural regions have obtained a new conception of the function of the various organizations in the community, and the part they may play in community betterment. Many communities have taken on new life due chiefly to the inspiration received by some person at the summer conference. This influence has by no means been confined to Amherst or to Massachusetts.

6. Agriculture, in the broader sense, in this State, has received much stimulation at the hands of the faculty, through the several extension activities.

7. Through the extension service the equipment of the college and the knowledge possessed by the experts on the faculty are made more useful to the citizens of the State who support the college.

8. Through the extension service the college becomes more nearly a "public service institution." It gives men and women who come to it a useful and practical education, which will fit them for the several pursuits and professions of life. It carries on experiments and research work to determine facts which later can be used for the education of students and in the upbuilding of the agriculture of the State. But more than this, the college is prepared, through its extension service, to carry the teachings of the college and the results of the work of the experiment station, by means of men especially trained for the task, to every community that asks for these helps.

## New Appointments.

The following appointments took effect during the winter of 1911: —

John Allan McLean was elected associate professor of animal husbandry to fill the position made vacant by the resignation of Mr. Ray L. Gribben, as instructor in the same subject. Professor McLean is a graduate of McMaster University, Toronto, Can., in 1902, and from the Iowa State College in 1905. The five years subsequent to his graduation from Iowa State College he devoted to teaching, occupying positions at the agricultural colleges of Colorado, Iowa and Mississippi.

John C. Graham was elected associate professor of poultry husbandry. For fourteen years Professor Graham was principal of the high school in Oshkosh, Wis.; in the winter of 1911 he received the degree of B.S.Agr. from the University of Wisconsin.

Guy C. Crampton was appointed associate professor of entomology. Dr. Crampton is a graduate of Princeton University in 1904, received the degree of A.M. at Cornell University, and the degree of Ph.D. after two years' study in Germany. He has taught several years with marked success.

The following appointments took effect September 1: —

Robert J. Sprague was appointed head of the division of the humanities and professor of economics and sociology. Dr. Sprague graduated from Boston University in 1897. He subsequently pursued graduate work at that institution, receiving the degree of A.M. in 1899 and Ph.D. in 1901; he also received the degree of A.M. from Harvard University in 1900. He has had a wide experience in teaching, and has studied, worked or traveled in Germany, Italy, Canada and the British Islands. For five years prior to his appointment here he was professor of economics and sociology at the University of Maine.

Edward M. Lewis was appointed assistant professor of English and assistant dean. Professor Lewis graduated from Williams College in 1896. Subsequently he studied at Harvard University. He received the degree of A.M. from his alma mater in 1899. Two years later he received a diploma from the Boston School of Expression. He taught elocution at Columbia University for two years, and for the past eight years has taught public speaking and oratory at Williams College. For some years, also, he has taught public speaking at Yale Divinity School.

Curry S. Hicks was appointed assistant professor of physical education and hygiene to fill the vacancy caused by the resignation of Dr. Percy L. Reynolds. Professor Hicks graduated from the Michigan State Normal College in 1908. Later he studied physical education at Amherst College, and last year was employed at the Michigan State Normal College as director of athletics and physical examiner.

Charles A. Peters, a graduate of Massachusetts Agricultural College in the class of 1897, was elected assistant professor of inorganic and soil chemistry. Dr. Peters has studied chemistry in Germany, also at Yale University, having earned the degree of Ph.D. in that subject; he has had a wide and successful experience in teaching, having been employed for several years at the University of Idaho.

Frederick L. Yeaw, a graduate of Massachusetts Agricultural College, in the class of 1905, was elected assistant professor of market gardening to take the place of Mr. Charles S. Heller who resigned in the summer. Professor Yeaw has been for five years employed as plant pathologist for the experiment station of the University of California, having had charge of the sub-station located at Davis.

George E. Gage was appointed assistant professor of animal pathology. Unique and full training in bacteriology and physiology fits Dr. Gage for this work. He had been engaged for some time by the experiment station of Maryland.

Dean George F. Mills returned to his college duties in September, after a leave of absence of one year.

Professor S. Francis Howard is on a leave of absence this year, and is spending the time in graduate study in chemistry at Johns Hopkins University.

In August Professor Frederick B. McKay resigned as assistant professor of English and public speaking. This position is being filled by Mr. Howard deF. Widger, a graduate of Yale University in 1910. Mr. Widger spent last year at Columbia University Law School.

An assistant director of extension work was appointed in June, Earnest D. Waid being elected to that position. Mr. Waid graduated from the Ohio State College in 1906, and since that time has been engaged in extension work in Maine and Ohio.

Albert R. Jenks, a graduate of Massachusetts Agricultural College in 1911, has been elected supervisor of correspondence courses in the extension service.

In the early spring Charles J. Robinson, extension instructor in dairying and animal husbandry, resigned. His position has been filled by the appointment of George F. E. Story, a graduate of Ohio State University in 1910.

Charles H. White, formerly connected with the extension service as field agent, was made district field agent for Worcester County, with headquarters at North Uxbridge.

### New Instructors and Assistants.

The following instructors also became connected with the teaching force September 1: —

| Position. | Name. | Institution from which graduated, and Degrees. | Year. |
|---|---|---|---|
| Instructor in physics, . . | Charles A. Butman, . | Massachusetts Institute of Technology; three years' graduate work at Clark and Yale Universities. | 1908 |
| Instructor in English, . | Willard A. Wattles, . . | University of Kansas, M.A., | 1911 |
| Instructor in French, . . | William L. Harmount, . | Yale University, . . | 1903 |
| Instructor in German, . | Arthur N. Julian, . . | Northwestern University, . | 1907 |
| Instructor in animal husbandry. | Elvin L. Quaife, . . | Iowa State College, B.Sc. Agr. | 1911 |
| Instructor in mathematics, | William L. Machmer, . | Franklin and Marshall, M.A., | 1911 |
| Instructor in landscape gardening. | Arthur K. Harrison, . | Associated with Mr. Manning. | |
| Assistant in mathematics and in military science. | Samuel R. Parsons, . | Massachusetts Agricultural College, B.Sc. | 1911 |
| Assistant in botany, . . | Frederick A. McLaughlin, | Massachusetts Agricultural College, B.Sc. | 1911 |
| Assistant in agronomy and secretary to director of experiment station. | Herbert J. Baker, . . | Massachusetts Agricultural College, B.Sc. | 1911 |
| Assistant in chemistry, . | Harold S. Adams, . . | Williams College, A.B., . | 1911 |

Rudolf W. Ruprecht, a graduate of the Rhode Island State College in 1911, is filling the additional position of assistant chemist in the experiment station, made necessary by the increased amount of work to be done in connection with the collection and analysis of fertilizers.

Sumner C. Brooks resigned as assistant in botany in the experiment station, and this position is being filled by Edward

A. Larrabee, who graduated from Massachusetts Agricultural College in 1911.

Just prior to Nov. 30, 1911, Joseph F. Merrill and Clement L. Perkins, assistants in the department of plant and animal chemistry of the experiment station, resigned to accept more lucrative positions elsewhere. Their successors have not yet been appointed.

*Changes in Title of Officers of the Institution.*

| NAME. | Former Title. | Present Title. |
|---|---|---|
| Edgar L. Ashley, | Instructor in German, | Assistant professor of German. |
| Joseph S. Chamberlain, | Associate professor of chemistry, | Associate professor of organic and agricultural chemistry. |
| Elmer K. Eyerly, | Assistant professor of political science and lecturer in rural sociology. | Associate professor of rural sociology. |
| Philip B. Hasbrouck, | Registrar of the college, associate professor of mathematics, and adjunct professor of physics. | Professor of physics and registrar of the college. |
| Joseph B. Lindsey, | – – – | Goessmann professor of agricultural chemistry. |
| Anderson A. Mackimmie, | Instructor in French, | Assistant professor of French. |
| George F. Mills, | Dean of the college, head of the division of the humanities, and professor of languages and literature. | Dean of the college, professor of languages and literature. |
| Charles Wellington, | Professor of general and agricultural chemistry. | Professor of chemistry. |

## NEW ADMINISTRATIVE ORGANIZATION.

By vote of the trustees at the June meeting the various departments of the college already organized, together with several others organized by the same action, were grouped into divisions. Each division has a head who acts as general administrative officer with more or less control over general policies, the extent of this control depending very largely upon the extent of the business transactions of the division. The head of the division of science is denominated the chairman of the division, and is appointed for two years on nomination by the heads of the departments in the division. The general departments of library, military science, and physical education are responsible directly to the president of the college, who for the present also retains the headship of the division of rural social science.

The original argument for developing this form of administrative organization lay in the fact that it was necessary to differentiate the departments of agriculture and horticulture into numerous departments. The question immediately arose, shall these departments be absolutely unrelated, or shall they be closely correlated? Obviously, groups of departments which in one case — horticulture — represent annual sales of $7,000, and in another case — agriculture — annual sales approaching $25,000, can best be handled by one administrative officer. The division idea, therefore, suggested itself as the solution of this problem. There are other forms of correlation, however, that are important, especially with respect to instruction. As the college grows it is evident that it will become more and more difficult for many problems to be discussed in general faculty meetings, particularly where those problems are of a character to interest special groups of men. The logical thing, therefore, seemed to be to organize the entire institution on the division basis. So far as possible, administrative details will be handled by the respective heads of divisions, in order that the instructors may give the larger share of their time and energy to the teaching work.

An important use of this new form of administrative organization has developed through the occasional convening of the various administrative officers, in an informal and unofficial way, as a sort of "cabinet" to the president for the discussion of general administrative questions.

It is intended that each department shall retain departmental integrity, and if the division system after a term of years is found not to meet the needs of the situation it can easily be abandoned.

### *Organization of Types of Work.*

In the discussion of the mission of the college, I referred to the threefold division of our work as to types, — research, instruction and extension service. In this institution the instruction may be divided into two main groups, — the undergraduate instruction and the graduate school. These four types of work also find their appropriate administrative organization under the administrative leadership of "directors," as follows: —

The dean of the college is the director of the undergraduate work or instruction so far as it applies to the relation of students to the work of the institution. At present the general questions of courses of study and methods of instruction are handled through a faculty committee.

The director of the experiment station is the director of all the research work of the institution, although for present purposes the agricultural survey is placed under the general charge of the extension service.

The director of the graduate school has general charge of the graduate teaching.

The director of the extension service is charged with the duty of developing the exterior activities of the institution.

The development of this general plan, and particularly the enlargement of the extension service, brings up a very important detail in the problem of administrative organization. Shall the extension service be organized as a separate faculty, or shall it be closely knit with the departmental organization of the institution? The plan which I strongly advocate is that of making each college-teaching department an administrative unit for all types of work. Theoretically, then, each department of the institution will have, or at least may have, four outlets for its energies: first, teaching of undergraduate students; second, teaching of graduate students; third, research and survey work; fourth, exterior teaching, or extension service. If the department is officered by only one or two men, manifestly either some types of work will be neglected or each man will be required to perform two or more types. As soon as a department, however, attains sufficient size to require the services of a large number of men, it is highly important that each man be employed for the specific purpose of giving the larger share of his time to some one type of work. What might be called a model department would have at least one man giving the bulk of his time to research, another to instruction of undergraduate students, another to the extension service. Of course, the number of men will depend upon the kind of work in the department, the resources of the college, and the demands of students and farmers generally for this special sort of work. I regard it as desirable that each man in the department should give a little time to some other work than that which represents his chief interest; for instance, that the research man in every department should give at least one teaching course, preferably to advanced undergraduates or graduate students. If he can lecture occasionally to bodies of farmers, so much the better; but his time and energy should not be too much divided among many interests. So I think that every instructor ought to be given time and opportunity for at least minor pieces of research, and if his subject reaches the popular need, should be called upon occasionally for extension service. It is, perhaps, rather difficult for the extension man to find opportunities for research or for regular instruction in the college, although he may assist in the short-course work. Under this scheme the head of a given department may unify all the types of work that belong to the subject matter of his department. There is the objection, of course, that this is a rather complex organization, but it seems to be the only logical outcome of the desire to organize an institution like ours on a businesslike administrative basis.

### *The Administrative Officers.*

The following is the schedule of the present administrative organization of the institution: —

The president.
The dean of the college.
The director of the experiment station.
The director of the graduate school.
The director of the extension service.
The registrar.
The treasurer.
The head of the division of agriculture.
The head of the division of horticulture.
The chairman of the division of science.
The head of the division of the humanities.
The head of the division of rural social science.
The assistant dean.

The following is the schedule of —

## *Organization for Teaching Purposes.*

| Classification. | Incumbent. | Academic Rank. |
|---|---|---|
| I. Division of Agriculture, | James A. Foord, | Head of division. |
| 1. Agronomy, | Sidney B. Haskell, | Assistant professor. |
| | William P. Brooks, | Lecturer. |
| | Herbert J. Baker, | Assistant. |
| 2. Animal husbandry, | John A. McLean, | Associate professor. |
| | Elvin L. Quaife, | Instructor. |
| 3. Dairying, | W. P. B. Lockwood, | Associate professor. |
| | G. F. E. Story, | Extension instructor. |
| 4. Farm administration, | James A. Foord, | Professor. |
| 5. Poultry husbandry, | John C. Graham, | Associate professor. |
| II. Division of Horticulture, | Frank A. Waugh, | Head of division. |
| 1. Floriculture, | Edward A. White, | Professor. |
| 2. Forestry, | Frank F. Moon, | Associate professor. |
| | Frank W. Rane, | Lecturer. |
| 3. Landscape gardening, | Frank A. Waugh, | Professor. |
| | Arthur K. Harrison, | Instructor. |
| 4. Market gardening, | Frederick L. Yeaw, | Assistant professor. |
| 5. Pomology, | Fred C. Sears, | Professor. |
| | Alvah J. Norman, | Extension instructor. |
| III. Division of Science, | James B. Paige, | Chairman of division. |
| 1. Botany, | George E. Stone, | Professor. |
| | A. Vincent Osmun, | Assistant professor. |
| | F. A. McLaughlin, | Assistant. |
| | M. T. Smulyan, | Graduate assistant. |
| | R. G. Smith, | Graduate assistant. |
| 2. Chemistry, | Joseph B. Lindsey, | Professor. |
| | Charles Wellington, | Professor. |
| | J. S. Chamberlain, | Associate professor. |
| | S. F. Howard, | Assistant professor. |
| | Charles A. Peters, | Assistant professor. |
| | William A. Turner, | Assistant. |
| | Harold S. Adams, | Assistant. |
| 3. Entomology, | Henry T. Fernald, | Professor. |
| | Guy C. Crampton, | Associate professor. |
| | Burton N. Gates, | Assistant professor.[1] |
| | William S. Regan, | Graduate assistant. |
| 4. Mathematics, | John E. Ostrander, | Professor. |
| | C. Robert Duncan, | Instructor. |
| | William L. Machmer, | Instructor. |
| | Samuel R. Parsons, | Assistant. |
| 5. Physics, | Philip B. Hasbrouck, | Professor. |
| | Chester A. Butman, | Instructor. |
| 6. Veterinary science, | James B. Paige, | Professor. |
| | George E. Gage, | Assistant professor. |
| 7. Zoölogy and geology, | Clarence E. Gordon, | Assistant professor. |
| | Leonard S. McLaine, | Graduate assistant. |
| IV. Division of the Humanities, | Robert J. Sprague, | Head of division. |
| 1. Economics and sociology, | Robert J. Sprague, | Professor. |
| 2. History and government, | Elmer K. Eyerly, | In charge. |
| | George N. Holcomb, | Lecturer. |
| 3. Languages and literature, | George F. Mills, | Professor. |
| English, | Robert W. Neal, | Associate professor. |
| | Edward M. Lewis, | Assistant professor. |
| | Willard A. Wattles, | Instructor. |
| | Helena Goessmann, | Assistant. |
| Public speaking, | H. deF. Widger, | Instructor. |
| German, | Edgar L. Ashley, | Assistant professor. |
| | Arthur N. Julian, | Instructor. |
| French, | A. A. Mackimmie, | Assistant professor. |
| | William L. Harmount, | Instructor. |
| V. Division of Rural Social Science, | Kenyon L. Butterfield, | Head of division. |
| 1. Agricultural economics, | Alexander E. Cance, | Assistant professor. |
| 2. Agricultural education, | William R. Hart, | Professor. |
| | Floyd B. Jenks, | Assistant professor. |
| 3. Rural sociology, | Elmer K. Eyerly, | Associate professor. |
| VI. General Departments: — | | |
| 1. Military science, | George C. Martin, | Professor and captain. |
| | Samuel R. Parsons, | Assistant. |
| 2. Physical education, | Curry S. Hicks, | Assistant professor. |
| 3. Library, | Charles R. Green, | Librarian. |

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[1] Beekeeping.

## Visits by Important Bodies.

To an increasing degree the college is becoming the objective for visits by important organizations or groups. The following is a list, doubtless incomplete, of such visits during the past year: —

| | Date. |
|---|---|
| Connecticut Valley Breeders' Association, | Jan. 24. |
| Massachusetts Dairymen's Association, | Mar. 15. |
| Home and School Garden Club, | Aug. 4. |
| Potato Culture Club, | Oct. 7. |
| Massachusetts Fruit Growers' Association, | Oct. 9. |
| Massachusetts Press Association, | Oct. 9. |
| Executive Committee of State Y. M. C. A., | Oct. 11. |
| Massachusetts State Poultry Association, | Oct. 11, 12. |
| Hampshire, Hampden, and Franklin Bee Keepers' Association, | Oct. 14. |
| Committee representing the Boston Gardeners' and Florists' Association, | Oct. 31. |
| Committee representing the Massachusetts Horticultural Society, | Oct. 31. |
| Officers of State Board of Education, | Nov. 21. |

## Construction and Repairs.

That part of the treasurer's work which consists in the oversight of college service, such as heating, lighting, etc., and the construction and repairs of buildings, has grown enormously during the past few years, and the demands on "general maintenance" have raised some rather important problems in administration. It has been very difficult to secure adequate help, and almost impossible to carry out promptly all of the projects assigned.

Two important buildings have been completed during the year: namely, the animal husbandry building and the cold storage building. The new dairy building has been begun, the building contract being given to H. Wales Lines Company of Meriden, Conn.; the heating and ventilating to Nichols & Drown Company of Lynn, Mass.; and the plumbing to William H. Mitchell & Sons of Boston. It is expected that the building will be completed by early summer.

The largest improvement project was in connection with the west experiment station building. Other improvements and many repairs, however, have been made or are still in process. For example, in the chemical laboratory the room formerly used for mathematics has been refitted for work in chemistry. In the social union room at North College a new fireplace has been built, the east and north entrances of the room closed, and an arch put in between the lounging room and the trophy room. A marked improvement has thus been accomplished. In the department of poultry husbandry there were erected and partially equipped a feed house, a brooder house, and a laying house. The task of repainting all of the college buildings has been begun, and this much-delayed improvement we hope may be completed before commencement.

New granolithic walks have been put in as follows: from the main walk east of the chapel to the ravine, and from South College past North College, across the ravine, to the dining hall. Walks have also been made connecting the president's house with the campus. A "stepping-stone" walk has been put in front of the new entomological building; these stepping stones are 20 inches square, laid 6 inches apart. Work has just started on the new apiary, located on the site of the "old creamery" building.

The new waiting station has been placed on the botanic walk, adjacent to the trolley line of the Amherst & Sunderland Railroad Company. This is "a long-felt want," and will be appreciated by the great number of people using it. The design was made by students in the department of landscape gardening.

Percy C. Schroyer, a graduate of the Michigan Agricultural College, in the class of 1908, has been engaged as assistant engineer.

## IMMEDIATE NEEDS OF THE COLLEGE.

The most effective way of stating the present needs of the college is to outline the reasons which underlie the action of the trustees in formulating the legislative budget for the ensuing year. However, numerous suggestions have come to me from the officers of the college, and while not all of the needs thus expressed have found a place in the legislative budget, it will be of interest to quote some of them here, as showing how difficult it is for the college to keep pace with the requirements made by its rapid expansion. The following are among "the immediate pressing needs," suggested by various administrative officers of the institution: —

"Greatly increased library facilities."

"Additional recitation and lecture rooms, particularly for the departments in the division of the humanities."

"Additional instructors, so that certain sections in required work may be made smaller."

"Increased scholarship requirements."

"The limiting of the number of subjects that may be taken by the student, and avoiding such multiplicity of subjects that a student may get a hazy idea of many subjects instead of a clear, well-defined idea of a few things."

"A new chemical laboratory."

"Provision for new lines of investigation in the experiment station, the most important of which are in the following subjects: poultry farming, horticulture, animal diseases, market gardening."

"Additional land for use in experimental work, especially in the agricultural department, the department of pomology and the department of entomology; the latter department needs a small area to be under its exclusive control."

"Various minor improvements at the experiment station which have been submitted in the form of projects."

"The employment of an additional assistant in animal nutrition to work in connection with Dr. Lindsey."

"Employment of an assistant for seed work with a view to studying the seed situation in its possible bearing upon the necessity of a seed law."

## The Legislative Budget of 1912.

The budget to be presented to the Legislature of 1912, as approved by the board of trustees at its meeting in Boston, November 3, may be summarized as follows: —

*Requested Increases in Current Funds, Available for Fiscal Year, Dec. 1, 1912, to Nov. 30, 1913.*

| Items. | Present Appropriations. | Increase asked. | Total asked. |
|---|---|---|---|
| Administration, | $25,000 | $5,000 | $30,000 |
| Maintenance and equipment, | 58,000 | 37,000 | 95,000 |
| Investigations, | 10,500 | 14,000 | 24,500 |
| Instruction, | 60,000 | 23,000 | 83,000 |
| Short courses and extension teaching, | 20,000 | 30,000 | 50,000 |
| Inspection service, | 3,000 | - | 3,000 |
| | $176,500 | $109,000 | $285,500 |

*Requests for Appropriations for Special Purposes, 1912.*

| | |
|---|---|
| Agricultural building and equipment, | $200,000 |
| Student dormitory, | 25,000 |
| Addition to French Hall, | 25,000 |
| Addition to Draper Hall, | 25,000 |
| Dwelling house for registrar, | 8,000 |
| Tenement house for farm help, | 6,000 |
| Sewers, | 10,000 |
| New equipment, | 31,525 |
| Repairs and minor improvements, | 20,760 |
| General improvements, | 35,135 |
| Total, | $386,420 |

*Statement of Reasons for Requested Increases in Current Funds.*

*Administration.* — Under the new legislative classification the appropriation for general administrative purposes is $25,000 a year. This includes the salaries of the general administrative officers of the college, the maintenance expense of their respective offices, and general charges that belong to the institution as a whole, such as, for illustration, publicity, commencement, etc. The current apportionment for the next fiscal year will show that the amount of $25,000 is not enough to carry the present charges. The charges will increase steadily year by year, and our request for an increase of this item to $30,000 a year is clearly justified by the situation.

*Maintenance and Equipment.* — The present appropriation under this item is $58,000 a year. The trustees have voted to ask the Legislature for an increase of $37,000, or a total of $95,-

000. Attention should be called to the fact that $30,000 of this increase is intended to cover permanent current appropriations of $15,000 each for repairs (and minor improvements), and for teaching equipment. It seems obvious enough that we should have at our disposal a reasonable sum each year for this purpose. The needs are sure to recur. They are not *special* needs. They are *current* needs. The Legislature cannot possibly judge wisely respecting the details of these expenditures. For two years prior to this we have asked the Legislature for these additions to our current income; so far without success. However, it is only businesslike that these additions should be made.

*Instruction.* — During the past few years the instruction force of the college has expanded quite rapidly, due to two main causes, the first of which is the increase in students. The attendance of students of college grade has increased more than 135 per cent. in the last five years. Necessarily this has called for more teachers, the addition of needed courses of study, and has also enlarged the work of existing departments. Furthermore, in order to keep pace with the rapidly developing field of agricultural instruction, a number of entirely new departments have been added. It will not be necessary in the future to add instructors at as rapid a rate as we have done during the past four years, but because of all the reasons just given for the recent expansion, there are still some important places to be filled. The estimates of the various departments call for additional instructors whose probable salaries would aggregate about $30,000 a year. The trustees have voted for an increase of $23,000. This is none too much. Instruction is the heart of the college. If we are inadequately equipped at this point we cannot possibly do the best work.

*Investigation.* — The income of the institution from the national treasury for experiment station work is fixed by law and can be changed only by congressional action. Under these conditions, as new needs arise they must be met, if at all, by appropriations from the State treasury. The trustees, therefore, acting on requests of various departments of the experiment station, are asking that the present State appropriation of $10,500 a year for investigation be increased to $24,500 a year. These investigations include an agricultural survey, experiments in floriculture, market gardening, veterinary science, and particularly important experiments in the department of poultry husbandry. These projects for new types of investigation are heartily supported by committees representing various producers' organizations of the Commonwealth.

*Short Courses and Extension Teaching.* — The present appropriation of $20,000 a year for extension service is entirely inadequate to meet the demands. The trustees have voted to ask the Legislature for $50,000 a year to carry on this important work. While it is not possible at this time to indicate the precise outlines of the plan for the best use of this added appropriation, I take pleasure in including at this point a statement from the director of extension service, giving his judgment as to the most important lines of work which should be developed in the near future: —

*Administration of the Work.* — Salaries, additional office equipment, traveling expenses, clerical help.

*The Development of the Correspondence Courses.* — Salary of supervisor, office equipment, clerical help, so that at least 1,000 may register in these courses.

*Itinerant Instruction.* — The extension schools, fair exhibits, educational trains, lectures, demonstrations, etc., require money for apparatus, and to defray the expenses of carrying on these, which are, perhaps, among the most important of our projects.

*Demonstration Orchards.* — To continue to plant these orchards and to provide help to supervise the growing of them.

*Traveling Instructor.* — To pay salary and expenses of a man provided with an automobile or covered "van," equipped with all kinds of demonstrating apparatus, to travel from town to town, giving demonstrations to small groups of farmers.

*Demonstration Plots.* — To provide funds so that demonstration plots showing results of the use of fertilizers, seed selection, rotation of crops, etc., can be placed all over the State and properly supervised by a representative from the college.

*Supervisor of Co-operative Work with Other State Institutions.* — Funds to pay salary and traveling expenses of a man, with the best of practical training, to take up this co-operative work that has been asked for by the other State institutions.

*Support for the Massachusetts Agricultural College Agricultural Improvement Association.* — Funds to provide selected seeds, printed instructions, and other material to be used as a basis for improving the agricultural industry of the State.

*Extension Instructor in Rural Engineering and Sanitation.* — To provide salary and traveling expenses of a man, trained in the problems of farm buildings, power on the farm, heat, lights and rural sanitation.

*Extension Instructor in Town Improvement and Civic Betterment.* — Funds to pay the salary of a man to work with village improvement officers, town officers and others on such subjects as beautifying the town, public roads, drives, parks, school grounds, cemeteries, streets, trees, etc., and to organize and federate all the forces of the community to work for one common end.

*Extension Instructor in Agricultural Education.* — To pay the salary and traveling expenses of a man to help school boards in the organization of agricultural work in high schools, and to take up and develop further the boys' and girls' club work which has already started so finely.

*Extension Instructor in Home Economics.* — To provide salary and expenses of a woman trained in this subject, especially from the rural standpoint, to give instruction in the short courses, to teach in the extension schools, to give lectures and demonstrations on foods and their value, cooking, canning, preserving, sanitation, labor-saving conveniences, household equipment, and to help in the introduction of these subjects into the smaller towns.

*District Field Agents.* — To pay salaries of several men to be located in good agricultural centers, to act as district field agents, devoting their entire time to the building up of the agriculture of the section in which they work.

*Extension Instructor in Poultry Management.* — To provide salary and expenses for a trained poultry man to give his time to helping the poultry interests of the State. At present, we cannot accept one-tenth of the calls made upon us.

*Extension Instructor in Dairying.* — Funds to pay salary and traveling expenses of a man to help teach this subject in the extension schools, and to give lectures and demonstrations and advice relating to dairying, both to producer and consumer.

*Extension Instructor in Farm Management.* — To pay salary and expenses of a man who shall help the farmers all over the State, in soil improvement, use of fertilizers, growing of field crops and in the general equipment and management of the farm.

*Extension Instructor in Animal Husbandry.* — Funds to pay salary and expenses of a man to organize breeders' and dairy improvement associations, advise as to feeding, and to give lectures and demonstrations on the care, management, selection, etc., of live stock.

*Short Courses.* — To provide funds for the further development of the several winter courses, and the continuation of the summer school and the conference for rural leaders.

## Appropriations for Special Purposes.

1. *For erecting and equipping an Agricultural Teaching and Laboratory Building, $200,000.* — Although the college has been open to students nearly forty-five years, it has never had a building devoted specifically to agricultural teaching.

Practically every agricultural college in the country finds it necessary and desirable to make such a building one of the most important on the campus.

The rapid increase in our agricultural students has crowded the agricultural departments out of their old quarters. It is almost impossible to do efficient teaching under present conditions.

The winter short-course students are also inadequately provided for.

The proposed building will have three stories and a basement, and contain offices, class rooms, laboratories for the departments of farm administration, agronomy, animal husbandry, poultry husbandry and agricultural engineering. It is proposed to erect a fireproof building and to equip it in harmony with the recent developments in these lines of work.

2. *For erecting a Student Dormitory, $25,000.* — This item was in our legislative budget one year ago. The need for it has grown, even with the year, as we have over 80 more men of college grade registered this autumn than a year ago. Students find it difficult to get rooms at any price, and room rents in private houses

are such as to make it a serious problem for many students who are working their way through college.

*3. For erecting and equipping an Addition to French Hall, $25,000.* — French Hall is a teaching building attached to the modern range of greenhouses, and was built about three years ago. It was so planned that only half of the building, as it should eventually stand, was erected, and it is now proposed to complete the building. Our division of horticulture has expanded, both in number of departments and in number of students taking the work, to such a degree that both teachers and students are seriously inconvenienced by the present crowded condition.

Furthermore, until we get a satisfactory building for the divisions of the humanities and rural social science, instructors in those divisions have to find class rooms wherever most available. Probably for several years this addition to French Hall will have to be used considerably by departments not connected with the division of horticulture.

*4. For erecting an Addition to Draper Hall, $25,000.* — This item has been asked for twice before. The present dining hall will not hold the student body. Moreover, the serving-room accommodations are entirely inadequate even for the present seating capacity of the dining hall. Hence the service is relatively costly and slow.

*5. For erecting a Dwelling to be occupied by the Registrar of the College, $8,000.* — The trustees are not ready to adopt the general policy of erecting residences upon the grounds for members of the teaching staff. They feel that it is extremely desirable for the president to live upon the grounds, as is now the case. There are a few other administrative officers, also, whose presence on or near the grounds seems to be a distinct advantage. One of these is the registrar of the college, who has to be consulted frequently by students. The registrar now occupies a cottage at the entrance of the grounds, which is scarcely habitable. It will not pay to repair it, and it is not right to ask an officer of the institution to reside there under such conditions. The business-like thing, therefore, seems to be to erect a dwelling on college property, to be occupied by the registrar of the institution, on terms that will represent a reasonable interest to the college on the investment.

*6. For erecting and equipping a Tenement House for Farm Help, $6,000.* — With the development of the live-stock interests, and particularly of the dairy herd, it has become imperative that quite a number of men should be housed near the college barns. Quarters formerly used for this purpose have been moved by the exigencies for new buildings, and other quarters must be provided.

*7. For providing Sewers for the College Estate, $10,000.* — The college does not have an adequate system of sewage disposal. The minor sewers have become too small for present use. The recently erected buildings have been provided with cesspools, but it is clearly evident that a thoroughly modern and complete sewerage system should be installed. It is both necessary and desirable that this system should be worked out in harmony with the plan of the town of Amherst for disposing of sewage in that part of the village which adjoins the college estate. Plans are being matured for this co-operation, and it is desired to begin work on the sewers at the earliest possible moment.

*8. New Equipment for Farm, Dairy Building, Dining Hall, College Service, and for Miscellaneous Teaching Equipment for Various Departments, $31,525.* — The college ought to have an annual income of not less than $20,000 for keeping up the teaching equipment. In lieu of this regular income we are obliged to ask the Legislature each year for a list of items needed to keep the equipment of college service — farm, horticulture and laboratories — up to par.

*9. For Repairs and Minor Improvements, $20,760.* — The same observations apply with respect to general repairs. The inventory of college buildings Dec. 1, 1911, exceeded $500,000. Twenty thousand dollars a year for general repairs is, therefore, 4 per cent. of the inventory value of the college buildings.

*10. For General Improvements, $35,135.* — This includes an addition to the poultry plant, an addition to the young stock barn, portable hog houses, a piggery, the development of the campus and miscellaneous improvements.

All of which is respectfully submitted,

KENYON L. BUTTERFIELD,
*President.*

AMHERST, Dec. 1, 1911.

# STATISTICS OF THE COLLEGE.

## TABLE I. — *Attendance.*

| | Registration Nov. 30, 1910. | Registration Nov. 30, 1911. |
|---|---|---|
| Senior class, | 47 | 85 |
| Junior class, | 87 | 97 |
| Sophomore class, | 110 | 127 |
| Freshman class, | 158 | 168 |
| | 402 | 477 |
| Graduate students, | 15 | 15 |
| Unclassified students, | 17 | 29 |
| Total doing work of college grade, | 434 | 521 |
| Short courses: — | | |
| Winter school, | 64 | 113 |
| Poultry course, | 51 | 74 |
| Summer school, | 229 | 153 |
| Beekeepers' course, | 20 | 16 |
| | 364 | 356 |
| Total, | 798 | 877 |

## TABLE II. — *Legislative Budget, 1911.*

| ITEMS. | Amount asked. | Amount granted. |
|---|---|---|
| 1. Special appropriations: — | | |
| Improvements, west experiment station, | $7,500 00 | $7,500 00 |
| Enlargement of Draper Hall, | 25,000 00 | – |
| Dormitory, | 25,000 00 | – |
| Dairy building and equipment, | 75,000 00 | 75,000 00 |
| Department equipment, | 15,000 00 | 10,000 00 |
| Repairs, | 20,000 00 | 15,000 00 |
| General improvements, | 25,000 00 | 15,000 00 |
| | $192,500 00 | $122,500 00 |
| 2. Increase in current annual appropriations: — | | |
| Administration, | $4,250 00 | $4,250 00 |
| Maintenance and equipment, | 43,250 00 | 13,250 00 |
| Investigation, | 5,000 00 | – |
| Instruction, | 22,500 00 | 12,000 00 |
| Short courses and extension, | 15,000 00 | 5,000 00 |
| Inspection service, | – | – |
| | $90,000 00 | $34,500 00 |
| Previous appropriation, | 142,000 00 | 142,000 00 |
| Total, | $232,000 00 | $176,500 00 |

TABLE III. — *Statistics of the Extension Service, 1910–11.*

| | ENROLLMENT. | | |
|---|---|---|---|
| | **1910.** | **1911.** | **Total.** |
| Ten weeks' winter course, | 65 | 113 | – |
| Special poultry course, | 51 | 74 | – |
| Farmers' week course, | 559 | 830 | – |
| Beekeepers', | 19 | 16 | – |
| Summer school, | 228 | 153 | – |
| Conference rural social workers, | 325 | 247 | – |
| Correspondence courses, | 106 | 370 | – |
| Totals, | 1,363 | 1,803 | – |
| Total number enrolled in short courses at the college (two years), | – | – | 3,166 |

Several organizations have held meetings two days in length at the college; no accounting is made of the attendance at these.

*Statistics of Extension Work done away from the College.*

| | **1910.** | **1911.** | **Total.** |
|---|---|---|---|
| Lectures and demonstrations: — | | | |
| Requested, | 123 | 600 | 723 |
| Impossible to give, | 69 | 222 | 291 |
| Lectures and demonstrations given, | 54 | 378 | 432 |
| Attendance (no actual account, but fully), | – | – | 20,000 |
| Education trains: — | | | |
| Boston & Albany: — | | | |
| Days on road, | 4 | None. | – |
| Stops made, | 18 | None. | – |
| Springfield trolley: — | | | |
| Days on road, | 3 | None. | – |
| Stops made, | 13 | None. | – |
| Lectures and demonstrations given on both trains, | 250 | None. | – |
| Total attendance at lectures (hundreds of others visited the train), | – | – | 9,000 |
| Exhibits at fairs, expositions, etc.: — | | | |
| Exhibits at fairs, | 6 | 10 | 16 |
| Lectures and demonstrations given, | 32 | 69 | 101 |
| Attendance both years, | – | – | 3,000 |
| Demonstration orchards: — | | | |
| Requests for orchards on file, | 31 | 99 | 130 |
| New orchards planted, | 4 | 4 | 8 |
| Renovation plots, | 2 | 2 | 4 |
| Massachusetts Agricultural College Agricultural Improvement Association: — | | | |
| Membership, | – | 110 | 110 |
| Boys' and girls' corn and potato clubs: — | | | |
| Number of clubs, | 125 | 350 | – |
| Number enrolled, | 8,300 | 16,900 | – |
| Total number enrolled in two years, | – | – | 25,200 |
| Conferences for community betterment: — | | | |
| Number held, | 2 | 4 | 6 |
| Total number attending, | – | – | 1,000 |
| Dairy improvement association: — | | | |
| Number organized, | – | 2 | 2 |
| Requests for others, | – | 3 | 3 |
| Number of members, | – | 52 | 52 |

*Statistics of Extension Work done away from the College* — Con.

| | 1909-10. | 1910-11. | Total. |
|---|---|---|---|
| Massachusetts Poultry Association, meetings at college: — | | | |
| Attendance, | 75 | 75 | 150 |
| Beekeepers' convention: — | | | |
| Attendance, | - | 75 | 75 |
| Polish farmers' day: — | | | |
| Attendance, | - | 95 | 95 |
| Total number known to have been actually reached through the extension work during the two years, | - | - | 61,848 |

## TABLE IV. — *Public Speakers for the Year.*

### *A. Speakers at Sunday Services for Year ending Nov. 30, 1911.*

1910.

Dec. 4. — Dr. Samuel A. Eliot, Boston.
Dec. 11. — Rev. Thomas Van Ness, Boston.

1911.

Jan. 8. — Rev. Herbert A. Jump, New Britain, Conn.
Jan. 15. — Rev. Philip S. Moxom, Springfield.
Jan. 22. — Rev. Clarence F. Swift, Fall River.
Feb. 12. — Rev. Albert P. Fitch, Cambridge.
Feb. 19. — Rev. John W. Ballantine, Stafford Springs, Conn.
Feb. 26. — Rev. Jason N. Pierce, Oberlin, O.
Mar. 5. — Princ. H. S. Cowell, Ashburnham.
Mar. 12. — Rev. Herbert J. White, Hartford, Conn.
Mar. 19. — Rev. O. P. Gifford, Brookline.
Sept. 17. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.
Nov. 5. — Dr. L. Clark Seelye, Northampton.
Nov. 12. — Pres. M. L. Burton, Northampton.
Nov. 19. — Hon. George H. Utter, Westerly, R. I.
Nov. 26. — Mr. Frank P. Speare, Boston.

### *B. Speakers at Wednesday Assemblies for Year ending Nov. 30, 1911.*

1910.

Dec. 7. — Mr. Harry Kimball, Boston.

1911.

Feb. 15. — Mr. J. B. Lewis, Boston.
Mar. 1. — Prof. Frank A. Updyke, Hanover, N. H.
Mar. 15. — Prof. Henry B. Wright, New Haven, Conn.
April 5. — Mr. George H. Cooper, Pittsfield.
April 12. — Prof. E. A. Ross, Madison, Wis.
May 10. — Prof. Edward M. Lewis, Williamstown.

1911.

May 17. — Dr. Charles W. Eliot, Cambridge.
May 31. — Hon. George H. Utter, Westerly, R. I.
Sept. 20. — Dean George F. Mills, Massachusetts Agricultural College.
Sept. 27. — Mr. Evan F. Richardson, Millis.
Oct. 4. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.
Oct. 11. — Mr. Albert E. Roberts, New York, N. Y.
Oct. 18. — Dean George D. Olds, Amherst.
Oct. 25. — Prof. George M. Harper, Princeton, N. J.
Nov. 1. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.
Nov. 8. — Prof. Edward M. Lewis, Massachusetts Agricultural College.
Nov. 15. — Hon. Frank A. Hosmer, Amherst.
Nov. 22. — Prof. J. W. Crook, Amherst.

TABLE V. — *Statistics of Freshmen entering Massachusetts Agricultural College in September, 1911.*

A. *Home Addresses (classified by Towns and Cities).*

| | | | | | |
|---|---|---|---|---|---|
| Amherst, | 4 | Granby, Conn., | 1 | Peabody, | 2 |
| Arlington, | 2 | Hanson, | 1 | Peterboro, N. H., | 1 |
| Ballston Spa, N. Y., | 1 | Hanson (South), | 2 | Pittsfield, | 1 |
| Barranquilla, Colombia, S.A., | 1 | Hingham, | 2 | Plymouth, | 1 |
| Barnstable (West), | 1 | Kingston, | 2 | Revere, | 2 |
| Barre, | 1 | Lancaster, | 1 | Rock, | 1 |
| Becket, | 1 | Lancaster (South), | 1 | Rockport, | 1 |
| Beverly, | 1 | Lanesville, | 1 | Rutherford, N. J., | 1 |
| Boston, | 13 | Lee, | 1 | Sandwich, | 1 |
| Bridgeport, Conn., | 1 | Leominster, | 1 | Sheffield, | 1 |
| Brockton, | 2 | Lincoln (South), | 1 | Shelburne, | 1 |
| Brookfield (North), | 1 | Littleton, | 1 | Sherborn, | 2 |
| Brookline, | 1 | Ludlow, | 1 | Somerville, | 3 |
| Brooklyn, N. Y., | 2 | Lynn, | 1 | South Hadley Falls, | 1 |
| Buckland, | 1 | Malden, | 1 | Southington, Conn., | 1 |
| Buffalo, N. Y., | 1 | Marshfield, | 1 | Springfield, | 3 |
| Burlington, | 1 | Mattapan, | 1 | Springfield (West), | 1 |
| Campello, | 2 | Melrose, | 9 | Sudbury (South), | 1 |
| Canton, China, | 1 | Melrose Highlands, | 2 | Sunderland, | 2 |
| Catasauqua, Pa., | 1 | Mendon, | 2 | Swampscott, | 1 |
| Chelsea, | 3 | Middletown, Conn., | 1 | Taunton, | 1 |
| Chesterfield, | 1 | Milford, | 1 | Topsfield, | 1 |
| Chicopee Falls, | 1 | Montague, | 2 | Wakefield, | 2 |
| Dana (North), | 1 | Natick, | 1 | Waltham, | 5 |
| Darien, Conn., | 1 | Newburyport, | 4 | Ware, | 1 |
| Dartmouth (North), | 2 | New Haven, Conn., | 2 | Warren, | 1 |
| Deerfield, | 1 | Newton, | 1 | Wellesley, | 1 |
| Dover, | 2 | Newton (West), | 1 | Westford, | 1 |
| Doylestown, Pa., | 1 | Newtonville, | 1 | Weymouth (East), | 1 |
| Dracut, | 1 | New York, N. Y., | 2 | Winchendon, | 1 |
| Duxbury (South), | 1 | Northampton, | 2 | Winthrop, | 3 |
| Enfield, | 1 | Norwood, | 1 | Worcester, | 7 |
| Evans Mills, N. Y., | 2 | Oak Bluffs, | 1 | | |
| Georgetown, | 1 | Orange, | 1 | | |
| Glens Falls, N. Y., | 1 | Oxford, | 1 | | |

### *B. Home Addresses (classified by Countries and States).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| China, | 1 | .60 | New York, | 9 | 5.39 |
| Connecticut, | 7 | 4.19 | Pennsylvania, | 2 | 1.20 |
| Massachusetts, | 145 | 86.82 | South America, | 1 | .60 |
| New Hampshire, | 1 | .60 | | | |
| New Jersey, | 1 | .60 | | 167 | 100.00 |

### *C. Home Addresses (classified by Counties of Massachusetts).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| Barnstable, | 2 | 1.38 | Middlesex, | 36 | 24.83 |
| Berkshire, | 6 | 4.14 | Nantucket, | – | – |
| Bristol, | 1 | .69 | Norfolk, | 6 | 4.14 |
| Dukes, | 1 | .69 | Plymouth, | 13 | 8.97 |
| Essex, | 13 | 8.97 | Suffolk, | 22 | 15.17 |
| Franklin, | 8 | 5.52 | Worcester, | 21 | 14.48 |
| Hampden, | 6 | 4.14 | | | |
| Hampshire, | 10 | 6.89 | | 145 | 100.01 |

### *D. Nativity of Parents.*

| | Number. | Per Cent. |
|---|---|---|
| Neither parent foreign born, | 132 | 79.04 |
| Both parents foreign born, | 22 | 13.17 |
| Father (only) foreign born, | 8 | 4.79 |
| Mother (only) foreign born, | 5 | 3.00 |
| | 167 | 100.00 |

### *E. Education of Father.*

| | Number. | Per Cent. |
|---|---|---|
| Common school, | 82 | 49.10 |
| High school, | 44 | 26.35 |
| Business school, | 13 | 7.79 |
| College or university, | 21 | 12.57 |
| No statistics, | 7 | 4.19 |
| | 167 | 100.00 |

### F. *Religious Census.*

| | MEMBERSHIP. | | PREFERENCE. | | TOTALS. | |
|---|---|---|---|---|---|---|
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. |
| Baptist, | 15 | 8.98 | 1 | .60 | 16 | 9.58 |
| Catholic, | 11 | 6.59 | 3 | 1.80 | 14 | 8.38 |
| Congregational, | 46 | 27.54 | 17 | 10.18 | 63 | 37.72 |
| Episcopal, | 13 | 7.79 | 2 | 1.20 | 15 | 8.98 |
| Hebrew, | 5 | 3.00 | – | – | 5 | 3.00 |
| Methodist, | 13 | 7.79 | 7 | 4.19 | 20 | 11.97 |
| Miscellaneous, | 3 | 1.80 | 6 | 3.59 | 9 | 5.39 |
| Presbyterian, | 4 | 2.40 | – | – | 4 | 2.40 |
| Unitarian, | 4 | 2.40 | 10 | 5.98 | 14 | 8.38 |
| Universalist, | 3 | 1.80 | 4 | 2.40 | 7 | 4.19 |
| | 117 | 71.09 | 50 | 29.94 | 167 | 99.99 |

### G. *Occupation of Fathers.*

| | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture (practical), | 37 | 22.16 |
| Artisans, | 33 | 19.76 |
| Business, | 50 | 29.94 |
| Deceased or no statistics, | 15 | 8.98 |
| Miscellaneous, | 14 | 8.38 |
| Professional, | 16 | 9.58 |
| Retired, | 2 | 1.20 |
| | 167 | 100.00 |

### H. *Intended Vocations of Students.*

| | Number. | Per Cent. |
|---|---|---|
| Agriculture or horticulture (practical), | 69 | 41.31 |
| Agriculture or horticulture (professional), | 52 | 31.14 |
| Professions, | 5 | 3.00 |
| Undecided or no statistics, | 38 | 22.76 |
| Engineering, | 3 | 1.80 |
| | 167 | 100.01 |

### I. *Farm Experience.*

| | Number. | Per Cent. |
|---|---|---|
| Brought up on a farm, | 43 | 25.75 |
| Not brought up on a farm and having had practically no farm experience, | 64 | 38.32 |
| Not brought up on a farm, but having had some farm experience, | 60 | 35.93 |
| | 167 | 100.00 |

### J. *Miscellaneous Statistics.*

| | |
|---|---|
| Average age, | 19.17 years. |
| Number applying for student labor, | 99 (59.28 per cent). |
| Number boarding at Draper Hall, | 129 (77.24 per cent). |

## TABLE VI. — *Statistics of Freshman Class.*

| | | | |
|---|---|---|---|
| Number of applications, | | | 281 |
| Admitted, | | 188 | |
| Matriculated, | 168 | | |
| Failed to report, | 20 | | |
| Total, | | 188 | |
| Rejected, | | 93 | |
| Total, | | | 281 |
| Admitted on certificate, | | | 110 |
| Admitted on examination, | | | 29 |
| Admitted on certificate and examination, | | | 29 |
| | | | 168 |
| Admitted without condition, | | | 115 |
| Admitted with condition, | | | 53 |
| | | | 168 |

## TABLE VII. — *Gifts.*

*Massachusetts Agricultural Experiment Station. — List of Gifts for the Year ending Nov. 30, 1911.*

| | |
|---|---|
| German Kali Works, New York City, | 200 pounds kainit.<br>1 ton high-grade sulfate of potash.<br>1,200 pounds carbonate of potash. |
| The Jarecki Chemical Company, Cincinnati, O., | 200 pounds calcined phosphate. |
| Vermont Marl Company, Brattleborough, Vt., | 11 tons shell marl. |
| Wilcox Fertilizer Company, Mystic, Conn., | 300 pounds dry-ground fish.<br>125 pounds dry-ground acid fish. |
| Rogers & Hubbard Company, Middletown, Conn., | 200 pounds dissolved bone. |
| Werner Extract Company, Mechanicsville, Ill., | 200 pounds Werner's phosphate. |
| Alphano Humus Company, New York City, | 150 pounds Alphano humus. |
| J. Bolgiana & Son, Baltimore, Md., | 1 packet seed of "My Maryland" tomato. |
| S. D. Woodruff & Sons, Orange, Conn., | 3 pounds sample "Woodruff" potatoes. |
| W. Atlee Burpee & Co., Philadelphia, Pa., | Novelties in vegetable and flower seeds. |
| Joseph Dixon Crucible Company, Boston, Mass., | 1 gallon Dixon's sillica-graphite paint. |
| Detroit White Lead Works, Detroit, Mich., | 2 gallons Jap. asphalt paint. |
| L. W. Ferdinand & Co., Boston, Mass., | 1 quart can glue cement. |
| Frederick Feeder Company, Perkasie, Pa., | 2 automatic feeders. |
| Poultry Dust Bath Company, Whiting, Ind., | 100 pounds Dustyne. |
| National Safety Soap Company, Wilmington, O., | 1 "Kling" hame fastener. |
| Sterling Chemical Company, Cambridge, Mass., | 5 gallons Sterlingworth San José scale killer.<br>5 gallons Sterlingworth lime and sulfur wash. |
| Boston Dry Food Hopper Company, Boston, Mass., | 5 feed hoppers. |
| Robert Essex Incubator Company, Buffalo, N.Y., | 1 Essex model incubator.<br>2 Essex model brooders. |

*Library. — List of Principal Gifts for the Year ending Nov. 30, 1911.*

| | |
|---|---|
| American Guernsey Cattle Club, Wm. H. Caldwell, M. A. C., 1887, Secretary, | Guernsey herd registers. |
| American Jersey Cattle Club, New York City, | Jersey herd register, 1902–10, 10 volumes. |
| American Shorthorn Breeders' Association, | Herd books. |
| Amherst Club, Amherst, Mass., | Wallace's Year Book of Trotting and Pacing, 2 volumes. |
| Bowker, William H., Boston, Mass., M. A. C., 1871. | Government documents and miscellaneous books. |
| Depew, Hon. Chauncey M., | Complete set of his writings, 8 volumes. |
| Chamberlain, Dr. J. S., Amherst, Mass., | Experiment station bulletins. |
| City Library Association, Springfield, Mass., | Proceedings of the American Association for the Advancement of Science. |
| Filer, H. B., M. A. C., 1906, | Buffalo park reports, 4 volumes. |
| Holstein-Friesian Association of America, | Herd books. |
| Indiana Academy of Science, | Proceedings, 16 volumes. |
| Iowa Academy of Science, | Proceedings, 16 volumes. |

*Library. — List of Principal Gifts for the Year ending Nov. 30, 1911 — Con.*

| | |
|---|---|
| Jones, Hon. J. W., Columbia, Tenn., | American jack stock studbook, volumes 1–8. |
| Kansas Academy of Science, | Transactions, 15 volumes. |
| Lodge, Hon. Henry Cabot, | United States government publications. |
| Massachusetts State Board of Agriculture, | 11 cases of early American agricultural periodicals, etc. |
| Massachusetts State Library, | Massachusetts public documents. |
| Michigan Academy of Science, | Proceedings, 12 volumes. |
| New York State Library, | New York public documents. |
| Percheron Society of America, | Percheron studbooks. |
| Queensland Department of Agriculture, | Queensland Agricultural Journal, 16 volumes. |
| Reliable Poultry Journal Publishing Company, Quincy, Ill., | 16 volumes. |
| Root, A. J. & Co., Medina, O., | Bee books. |
| Smithsonian Institution, Washington, D. C., | Harriman Alaska Expedition, 11 volumes. |
| Stoeckel, Hon. Carl, Norfolk, Conn., | Litchfield County University Club publications, volumes 1–4. |
| Stone, Dr. George E., Amherst, Mass., | Magazines and bulletins. |
| United States Department of Agriculture, Washington, D. C., | Foreign and domestic agricultural publications. |
| United States Monetary Commission, Washington, D. C., | Complete set of publications. |
| University of Wisconsin, Madison, Wis., | Transactions of the Wisconsin Academy of Arts and Sciences, and publications of the University of Wisconsin. |
| Waugh, Mrs. F. A., Amherst, Mass., | Magazines and books. |
| Williams, Mrs. Mary E., Amherst, Mass., | Books. |

*Academic Departments. — List of Gifts for the Year ending Nov. 30, 1911.*

| | |
|---|---|
| Col. John E. Thayer, Lancaster, Mass., | Valuable collection of 234 bird skins. |
| New York Zoölogical Society, | Skeletons of an American deer and a South American tapir. |
| James A. Hyslop, M. A. C., 1908, | Collection of skins of 17 small mammals and 14 birds from Washington State. |
| Rev. J. M. Lewis, North Westport, Mass., | A new variety of the common mouse. |
| William R. Bent, M. A. C., 1912, | Duck skin. |
| R. R. Parker, M. A. C., 1912, | Marine worms and fishes. |
| G. A. Post, M. A. C., 1913, | Ostrich egg from east coast of Africa; also small collection of miscellaneous birds' eggs. |
| Dr. H. T. Fernald, Amherst, Mass., | Albino shrew. |
| G. N. Willis, M. A. C., 1905, | Miscellaneous birds' eggs. |
| D. N. West, M. A. C., 1902, | Natural asbestos rock and samples in processes of manufacture from Black Lake, Quebec, Can. |
| A. F. McDougall, M. A. C., 1913, | Quartz crystals and small collection of invertebrate fossils. |
| M. S. Hazen, M. A. C., 1910, | Samples of crushed Florida phosphate rock dust, and acid phosphate; shark's teeth from phosphate rock; specimens of coal, minerals, etc., from coal mines near Moosic, Pa. |
| J. A. Harlow, M. A. C., 1912, | Quartz crystals. |
| Ozone Pure Airifier Company, Chicago, Ill., | Ozone Pure Airifier. |
| Field Force Pump Company, Elmira, N. Y., | Nozzles. |
| Goulds Manufacturing Company, Seneca Falls, N. Y., | Nozzles. |
| Perth-Amboy Chemical Company, New York, N. Y., | Formaldehyde. |
| Root Company, Medina, O., | Collection of smokers and sundry tools; feeders; collection of standard beehives enameled for exhibition purposes; mounted specimens of their products, such as sections, etc.; transportation cages for live bees; queen mailing boxes and complete queen rearing outfit. Total value about $50. |
| W. T. Falconer Manufacturing Company, Jamestown, N. Y., | Collection of hives, sections, wax foundation, and beekeepers' implements. |
| E. M. Nichols, Lyonsville, Mass., | Samples of hives; collection of bottom boards and covers; feeders, etc. |
| The American Paper Products Company, St. Louis, Mo., | Samples of "Appco Shipsafe," honey transportation cases. |
| J. E. Crane, Middlebury, Vt., | One Crane honey shipping case. |
| E. H. Dewey, Great Barrington, Mass., | Two Dewey foundation fasteners. |

*Academic Departments. — List of Gifts for the Year ending Nov. 30, 1911* — Con.

| | |
|---|---|
| D. S. Hall, South Cabot, Vt., | Models of Hall's frames. |
| J. L. Byard, Southborough, Mass., | One colony of superior Italian bees. |
| A. A. Byard, West Chesterfield, N. H., | Newly invented Byard foundation fastener. |
| American Sugar Refining Company, Granite Street, Boston, Mass., | Exhibit of 12 samples of sugar products. |
| Arthur C. Miller, Providence, R. I., | Miller's newly invented foundation fastener and hive tool. |
| American Can Company, Chicago, Ill., | Large collection of types of cans for shipping honey. |
| O. M. Smith, Florence, Mass., | Smith's hive tool. |
| H. H. Jepson, Boston, Mass., | Various minor implements. |
| New York State Association of Beekeepers' Societies (through courtesy of W. F. Marks, Clifton Springs, N. Y.), | 1 writing tablet as a sample of propaganda used in increasing interest in bees and honey among school children. |
| Dr. James B. Paige, M. A. C., 1882, | 1 swarm catcher. |
| O. F. Fuller, Blackstone, Mass., | 1 complete outfit for commercial queen rearing. |
| L. A. Aspinwall, Jackson, Mich., | 1 Aspinwall hive. |
| Jesse Carpenter, Jr., M. A. C., 1912, | Washington insects. |
| W. E. Dickinson, M. A. C., 1907, Hakalau, Hawaii, | Hawaiian mantid. |
| H. T. Cowles, M. A. C., 1910, San Tusco, P. R., | Porto Rican insects. |
| W. V. Tower, M. A. C., 1903, San Juan, P. R., | Porto Rican lepidoptera. West Indian scale insects. |
| Dr. G. C. Crampton, Amherst, Mass., | Cuban lepidoptera. |
| P. P. Cardin, M. A. C., 1909, Santiago de las Vegas, Cuba, | Cuban insects. |
| C. W. Hooker, Mayaguez, P. R., | Coleoptera, etc., from Wisconsin. |
| C. C. Gowdey, M. A. C., 1908, Entebbe, Uganda, | African insects. |
| Dr. H. T. Fernald, Amherst, Mass., | Nantucket insects. |
| R. H. Van Zwaluwenburg, M. A. C., 1913, U. J., | Mexican insects. |
| C. A. Frost, M. A. C., South Framingham, Mass., | Ichneumonidæ. |
| C. C. Gowdey, M. A. C., 1908, Entebbe, Uganda., | Indian scale insects. |
| J. N. Summers, M. A. C., 1907, Melrose Highlands, Mass., | European and American coleoptera. |
| United States Bureau of Entomology (through H. P. Wood, M. A. C., 1907), | Collection of ticks. |
| W. S. Regan, M. A. C., 1908, Amherst, Mass., | Work of the carpenter worm. |
| United States Bureau of Entomology, Melrose Highlands, Mass., | Imported parasites of the gypsy and browntail moths. |
| Dr. F. H. Chittenden, Bureau of Entomology, Washington, D. C., | Southern truck crop insects. |
| Dr. G. C. Crampton, Amherst, Mass., | Hemiptera from Syria. |
| H. A. Ballou, M. A. C., 1895, Barbados, W. I., | Insects from Barbados. |
| Dr. G. C. Crampton, Amherst, Mass., | Hymenoptera from the Riviera. |
| Q. S. Lowry, M. A. C., 1913, | Mantispa and eupsalis. |
| T. H. Jones, M. A. C., 1908, Washington, D. C., | Entomological books. |
| C. W. Hooker, Mayaguez, P. R., | Entomological pamphlets and photographs. |
| Field Force Pump Company, Elmira, N. Y., | "Empire King" pump and accessories. |
| Deming Company, Salem, O., | Barrel pump and nozzle frame. |
| Turner Brass Works, Sycamore, Ill., | Two types of gasoline torch. |
| California Spray Chemical Company, Watsonville, Cal., | Sample of zinc arsenite. |
| Frank N. Hale, Woonsocket, R. I., | Sample of entomoid. |
| Merrimac Chemical Company, Boston, Mass., | Samples of Swift's arsenate of lead. |
| Sherwin-Williams Company, Cleveland, O., | Sample of soil fungicide and insecticide. |
| Carbolineum Wood Preserving Company, New York, N. Y., | Sample of "Avenarius Carbolineum." |
| Manhattan Oil Company, New York, N. Y., | Sample of "Spray on." |
| Hon. E. B. White, Leesburg, Va., | Pure-bred two-year-old Percheron stallion (loan). |
| Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C., | Pure-bred Morgan stallion, Red Oak (loan). |
| L. A. Nichols, M. A. C., 1871, Chicago, Ill., | 3 100-foot steel tapes.<br>4 jointed range poles.<br>4 sets marking pins. |
| C. B. Travis, Brighton, Mass., | 20 eggs for hatching.<br>2 white Leghorn males.<br>File of "Farm Poultry." |
| Rockandotte Farm, Southborough, Mass., | 50 eggs for hatching. |
| Henry D. Smith, Rockland, Mass., | Discount on heating apparatus, brooder house, amounting to about $70. |
| DeLaval Separator Company, | 2 separators (1 hand, 1 power) (loan).<br>1 cutaway separator (for demonstration) (loan). |
| Sharpless Separator Company, | 2 separators (1 hand, 1 power) (loan). |
| Vermont Farm Machine Company, | 1 hand separator with belt attached (loan). |
| International Harvester Company, | 1 hand separator (loan). |
| Creamery Packing Manufacturing Company, | Several sanitary pipe fittings (loan). |
| P. R. Zeigler & Co., | 1 sterilac milk pail. |

# REPORT OF THE TREASURER

## FOR THE FISCAL YEAR ENDING NOV. 30, 1911.

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### BALANCE SHEET.

| | | | DR. | CR. |
|---|---|---|---|---|
| **1910.** | | | | |
| Dec. 1. | To cash on hand, | | $5,664 38 | |
| | To cash on deposit, | | 19,980 42 | |
| **1911.** | | | | |
| Nov. 30. | To special appropriation receipts, State Treasurer, | | 90,065 88 | |
| | By special appropriation disbursements, | | | $94,745 20 |
| | To experiment station receipts, | | 63,277 10 | |
| | From State Treasurer, | $13,500 00 | | |
| | From United States Treasurer, | 30,000 00 | | |
| | From other sources, | 19,777 10 | | |
| | By experiment station disbursements, | | | 64,986 68 |
| | To current accounts receipts, | | 216,555 22 | |
| | From United States Treasurer, Morrill fund, | $16,666 66 | | |
| | From United States Treasurer, Nelson fund, | 16,666 67 | | |
| | From State Treasurer, endowment fund, | 10,613 32 | | |
| | From State Treasurer, maintenance, | 35,000 00 | | |
| | From State Treasurer, scholarship, | 15,000 00 | | |
| | From State Treasurer, instruction, | 47,500 00 | | |
| | From State Treasurer, Extension department, | 15,000 00 | | |
| | From State Treasurer, agricultural education department, | 5,000 00 | | |
| | From State Treasurer, veterinary department, | 1,000 00 | | |
| | From State Treasurer, student labor, | 7,500 00 | | |
| | From State Treasurer, graduate school, | 2,500 00 | | |
| | From other sources, | 44,108 57 | | |
| | By current account disbursements, | | | 215,941 81 |
| | To student trust funds receipts, | | 66,308 10 | |
| | By student trust funds disbursements, | | | 62,251 38 |
| | By experiment station trust funds disbursements, | | | 257 40 |
| | By cash on hand, | | | 8,229 09 |
| | By cash on deposit, | | | 15,439 54 |
| | | | $461,851 10 | $461,851 10 |

## STATEMENT OF THE FIRST NATIONAL BANK OF AMHERST WITH THE MASSACHUSETTS AGRICULTURAL COLLEGE.

| | | DR. | CR. |
|---|---|---|---|
| **1910.** Dec. 1. | Balance on hand, | $40,168 47[1] | |
| **1911.** Nov. 30. | Deposits, | 468,207 93 | |
| | Interest, | 497 79 | |
| | Disbursements as per warrants, | | $468,897 79 |
| | Balance on hand, | | 39,976 40[1] |
| | | $508,874 19 | $508,874 19 |

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[1] These amounts are greater Dec. 1, 1910, by $20,188.05, and Nov. 30, 1911, $24,536.86, on account of outstanding checks.

## SPECIAL APPROPRIATIONS.

| NAME OF APPROPRIATION. | Date made. | Amount of Appropriation. | Amount previously expended. | Amount expended during Fiscal Year. | Amount expended to Date. | Amount received from State Treasurer. | Balance on Hand with State Treasurer. |
|---|---|---|---|---|---|---|---|
| Zoölogy building, | 1909 | $80,000 00 | $66,771 03 | $13,246 32 | $80,017 35 | $80,017 35[1] | - |
| Animal husbandry building, | 1910 | 10,000 00 | 4,166 35 | 5,833 65 | 10,000 00 | 10,000 00 | - |
| Investigation as to cranberry growing, | 1910 | 15,000 00 | 12,799 31 | 2,200 69 | 15,000 00 | 15,000 00[2] | - |
| Laboratory for pomology, | 1910 | 12,000 00 | 1,223 38 | 10,776 62 | 12,000 00 | 12,000 00 | - |
| Land, | 1910 | 17,500 00 | 11,797 11 | - | 11,797 11 | 11,797 11 | $65 98 |
| Poultry husbandry, | 1910 | 5,000 00 | - | 5,001 00 | 5,001 00 | 5,001 00[1] | - |
| Repairs and improvements, | 1910 | 25,000 00 | 16,640 06 | 8,359 94 | 25,000 00 | 25,000 00 | - |
| Teaching and office equipment, | 1910 | 10,000 00 | 2,984 13 | 7,015 87 | 10,000 00 | 10,000 00 | - |
| Equipment for laboratory for entomology and zoölogy, | 1910 | 15,000 00 | 5,872 19 | 9,127 81 | 15,000 00 | 15,000 00 | - |
| Dairy building, | 1911 | 75,000 00 | 1,804 87 | 11,014 99 | 12,819 86 | 7,948 24 | 67,051 76 |
| Equipment, | 1911 | 10,000 00 | - | 3,355 23 | 3,355 23 | 2,804 29 | 7,195 71 |
| Repairs, | 1911 | 15,000 00 | - | 4,579 31 | 4,579 31 | 3,839 63 | 11,160 37 |
| Small buildings, | 1911 | 15,000 00 | - | 7,792 32 | 7,792 32 | 6,484 28 | 8,515 72 |
| West experiment station, | 1911 | 7,500 00 | 200 00 | 5,105 18 | 5,305 18 | 4,420 15 | 3,079 85 |
| Architects' fees, | - | - | 1,150 57 | 1,197 79 | 2,348 36 | - | - |
| Farm buildings, | - | - | - | 138 48 | 138 48 | - | - |
| | | $312,000 00 | $125,409 00 | $94,745 20 | $220,154 20 | $209,312 05 | $97,069 39 |

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[1] From State Treasurer and other sources.

[2] $12,736.25 was paid by State Treasurer direct.

## CURRENT ACCOUNTS.

### *Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1, 1910, to Nov. 30, 1911. | Receipts from Dec. 1, 1910, to Nov. 30, 1911. | Apportionment for Year ending Nov. 30, 1911. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $6,233 96 | $2 36 | $10,000 00 | $3,768 40 |
| Agricultural division, | 22,788 40 | 19,052 37 | 4,000 00 | 263 97 |
| Agricultural economics, | 91 28 | – | 100 00 | 8 72 |
| Agricultural education, | 5,705 78 | 17 67 | 4,968 70 | —719 41 |
| Botanical, | 1,442 56 | 769 55 | 700 00 | 26 99 |
| Chemical, | 3,520 50 | 2,328 43 | 800 00 | —392 07 |
| Dean's office, | 202 45 | – | 200 00 | —2 45 |
| Entomological, | 1,084 82 | 275 79 | 850 00 | 40 97 |
| Extension work, | 20,811 41 | 2,864 87 | 12,534 60 | —5,411 94 |
| Floriculture, | 3,499 93 | 2,761 82 | 1,100 00 | 361 89 |
| Forestry, | 392 77 | 50 | 500 00 | 107 73 |
| General horticulture, | 2,585 00 | 659 80 | 2,000 00 | 74 80 |
| General maintenance, | 39,136 73 | 10,573 42 | 35,000 00 | 6,436 69 |
| Graduate school, | 1,339 18 | 120 00 | 3,586 81 | 2,367 63 |
| Grounds, | 1,900 61 | 1 70 | 2,200 00 | 301 09 |
| Library, | 5,542 46 | 436 91 | 5,000 00 | —105 55 |
| Landscape gardening, | 433 72 | 256 93 | 250 00 | 73 21 |
| Language and literature, | 598 99 | – | 900 00 | 301 01 |
| Market gardening, | 4,413 12 | 2,293 74 | 2,400 00 | 280 62 |
| Mathematics and physics, | 361 75 | 10 | 500 00 | 138 35 |
| Military, | 1,939 42 | 24 79 | 1,900 00 | —14 63 |
| Physical education, | 497 60 | 119 00 | 400 00 | 21 40 |
| Political science, | 85 07 | – | 25 00 | —60 07 |
| Pomology, | 3,425 41 | 1,156 58 | 1,800 00 | —468 83 |
| President's office, | 873 68 | 28 44 | 900 00 | 54 76 |
| Registrar, | 302 13 | – | 300 00 | —2 13 |
| Salaries, | 84,132 15 | – | 85,034 00 | 901 85 |
| Treasurer's office, | 764 18 | – | 800 00 | 35 82 |
| Veterinary, | 1,343 35 | 17 50 | 1,771 45 | 445 60 |
| Zoölogy, | 493 40 | 346 30 | 100 00 | —47 10 |
| State Treasurer: — | | | | |
| Endowment fund, | – | 10,613 32 | – | – |
| Maintenance, | – | 35,000 00 | – | – |
| Scholarship, | – | 15,000 00 | – | – |
| Instruction, | – | 47,500 00 | – | – |
| Extension department, | – | 15,000 00 | – | – |
| Agricultural education, | – | 5,000 00 | – | – |
| Veterinary, | – | 1,000 00 | – | – |
| Student labor fund, | – | 7,500 00 | – | – |
| Graduate school, | – | 2,500 00 | – | – |
| United States Treasurer: — | | | | |
| Morrill fund, | – | 16,666 66 | – | – |
| Nelson fund, | – | 16,666 67 | – | – |
| | $215,941 81 | $216,555 22 | $180,620 56 | $16,011 50 |
| Balance beginning fiscal year, Dec. 1, 1910, | – | 25,211 22[1] | – | —7,224 18 |
| Balance on hand Nov. 30, 1911, | 25,824 63 | – | – | – |
| | $241,766 44 | $241,766 44 | $180,620 56 | $8,787 32 |

[1] This amount is greater by $3,155.78 on account of architects' fees, which amount has been transferred to the accounts under special appropriations.

## *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| By cash on hand Dec. 1, 1910, | – | $25,211 22 |
| By institution receipts Nov. 30, 1911, | – | 44,108 57 |
| By State Treasurer's receipts Nov. 30, 1911, | – | 139,113 32 |
| By United States Treasurer's receipts Nov. 30, 1911, | – | 33,333 33 |
| To total disbursements, | $215,941 81 | – |
| | $215,941 81 | $241,766 44 |
| Bills receivable Dec. 1, 1910, deducted, | – | 2,187 72 |
| Bills payable Dec. 1, 1910, deducted, | 1,668 77 | – |
| | $214,273 04 | $239,578 72 |
| Bills receivable Nov. 30, 1911, | – | 2,265 82 |
| Bills payable Nov. 30, 1911, | 3,059 45 | – |
| Balance, | 24,512 05 | – |
| | $241,844 54 | $241,844 54 |

## *Comparative Disbursements and Receipts for 1910-11.*

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | **1910.** | **1911.** | **1910.** | **1911.** |
| Administration, | $4,729 04 | $6,233 96 | $30 07 | $2 36 |
| Agricultural division, | 22,028 79 | 22,788 40 | 16,339 90 | 19,052 37 |
| Agricultural economics, | 112 60 | 91 28 | – | – |
| Agricultural education, | 5,047 21 | 5,705 78 | 15 91 | 17 67 |
| Botanical, | 994 05 | 1,442 56 | 259 34 | 769 55 |
| Chemical, | 2,137 73 | 3,520 50 | 2,075 14 | 2,328 43 |
| Dean's office, | 232 36 | 202 45 | 36 | – |
| Entomology, | 515 29 | 1,084 82 | 251 61 | 275 79 |
| Extension work, | 12,336 03 | 20,811 41 | 1,745 63 | 2,864 87 |
| Floriculture, | 2,987 80 | 3,499 93 | 2,495 93 | 2,761 82 |
| Forestry, | – | 392 77 | – | 50 |
| General horticulture, | 2,436 18 | 2,585 00 | 805 51 | 659 80 |
| General maintenance, | 32,405 40 | 39,136 73 | 10,739 37 | 10,573 42 |
| Graduate school, | 1,413 19 | 1,339 18 | – | 120 00 |
| Grounds, | 1,444 30 | 1,900 61 | 54 10 | 1 70 |
| Library, | 5,083 89 | 5,542 46 | 567 51 | 436 91 |
| Landscape gardening, | 258 21 | 433 72 | 123 90 | 256 93 |
| Language and literature, | 539 69 | 598 99 | 1 00 | – |
| Market gardening, | 4,970 60 | 4,413 12 | 2,604 94 | 2,293 74 |
| Mathematics and physics, | 251 74 | 361 75 | 1 12 | 10 |
| Military, | 1,657 52 | 1,939 42 | 53 25 | 24 79 |
| Physical education, | 566 41 | 497 60 | 137 85 | 119 00 |
| Political science, | 7 05 | 85 07 | – | – |
| Pomology, | 3,237 78 | 3,425 41 | 1,398 70 | 1,156 58 |
| President's office, | 721 91 | 873 68 | 15 25 | 28 44 |
| Options on land, | 125 00 | – | 115 00 | – |
| Registrar, | 249 12 | 302 13 | – | – |
| Salaries, | 71,124 91 | 84,132 15 | 143 32 | – |
| Treasurer's office, | 753 75 | 764 18 | 34 69 | – |
| Veterinary, | 777 42 | 1,343 35 | 5 90 | 17 50 |
| Zoölogy, | 392 73 | 493 40 | 275 41 | 346 30 |
| State Treasurer: — | | | | |
| Endowment fund, | – | – | 10,613 32 | 10,613 32 |
| Maintenance, | – | – | 33,000 00 | 35,000 00 |
| Scholarship, | – | – | 15,000 00 | 15,000 00 |
| Instruction, | – | – | 40,000 00 | 47,500 00 |
| Extension department, | – | – | 8,125 00 | 15,000 00 |
| Agricultural education, | – | – | 5,000 00 | 5,000 00 |
| Veterinary, | – | – | 1,000 00 | 1,000 00 |
| Student labor fund, | – | – | 7,500 00 | 7,500 00 |
| Graduate school, | – | – | 2,500 00 | 2,500 00 |
| United States Treasurer: — | | | | |
| Morrill fund, | – | – | 16,666 67 | 16,666 66 |
| Nelson fund, | – | – | 13,333 33 | 16,666 67 |
| | $179,537 70 | $215,941 81 | $193,029 03 | $216,555 22 |
| Balance beginning of fiscal year, | – | – | 11,719 89 | 25,211 22 |
| Balance at close of fiscal year, | 25,211 22[1] | 25,824 63 | – | – |
| | $204,748 92 | $241,766 44 | $204,748 92 | $241,766 44 |

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[1] This amount is greater by $3,155.78 on account of architect's fees, which amount has been transferred to the accounts under special appropriations.

## EXPERIMENT STATION.

### *Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1. 1910, to Nov. 30, 1911. | Receipts from Dec. 1, 1910, to Nov. 30, 1911. | Apportionment for Year ending Nov. 30, 1911. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $1,669 79 | $123 79 | $2,085 00 | $539 00 |
| Agriculture, | 4,864 07 | 2,128 14 | 2,300 00 | —435 93 |
| Asparagus, | 748 63 | – | 500 00 | —248 63 |
| Botanical, | 1,577 35 | 20 82 | 1,500 00 | —56 53 |
| Chemical, | 9,809 16 | 7,165 66 | 2,400 00 | —243 50 |
| Cranberry, | 4,038 98 | 4,232 00 | 1,000 00 | 1,193 02 |
| Entomological, | 588 10 | 2 50 | 700 00 | 114 40 |
| Fertilizer, | – | 6,094 83 | – | 6,094 83 |
| Freight, | 294 49 | – | 450 00 | 155 51 |
| Feed law, | 2,891 44 | 3,000 00 | – | 1,676 45 |
| Graves orchard, | 194 79 | – | 300 00 | 105 21 |
| Horticulture, | 1,439 97 | 4 36 | 1,350 00 | —85 61 |
| Library, | 161 56 | – | 300 00 | 138 44 |
| Meteorology, | 322 16 | – | 400 00 | 77 84 |
| Publications, | 1,726 40 | – | 3,000 00 | 1,273 60 |
| Salaries, | 33,899 31 | – | 36,136 19 | 2,236 88 |
| Treasurer's office, | 182 12 | – | 350 00 | 167 88 |
| Veterinary, | 238 16 | 5 00 | 250 00 | 16 84 |
| Hatch fund, | – | 15,000 00 | – | – |
| Adams fund, | – | 15,000 00 | – | – |
| State fund, | – | 10,500 00 | – | – |
| Tobacco experiments, | 340 20 | – | 200 00 | —140 20 |
| | $64,986 68 | $63,277 10 | $53,221 19 | $13,789 90 |
| Balance beginning of fiscal year, | – | 5,799 94 | – | —1,210 40 |
| Balance on hand Nov. 30, 1911, | 4,090 36 | – | – | – |
| | $69,077 04 | $69,077 04 | $53,221 19 | $12,579 50 |

### *Experiment Station Trust Fund.*

| ACCOUNT. | Disbursements for Year ending Nov. 30, 1911. | Balance brought forward Dec. 1, 1910. |
|---|---|---|
| Cranberry growers' contribution account, | $257 40 | $257 40 |

### *Comparative Disbursements and Receipts, 1910-11.*

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1910. | 1911. | 1910. | 1911. |
| Administration, | $1,722 57 | $1,669 79 | $32 80 | $123 79 |
| Agriculture, | 5,286 14 | 4,864 07 | 2,963 67 | 2,128 14 |
| Asparagus, | 736 59 | 748 63 | – | – |
| Botanical, | 1,283 19 | 1,577 35 | 28 70 | 20 82 |
| Chemical, | 9,228 18 | 9,809 16 | 6,660 08 | 7,165 66 |
| Cranberry, | 1,504 29 | 4,038 98 | 1,958 54 | 4,232 00 |
| Entomology, | 562 81 | 588 10 | 1 20 | 2 50 |
| Fertilizer, | – | – | 5,880 00 | 6,094 83 |
| Freight, | 445 03 | 294 49 | 85 | – |
| Feed law, | 3,580 61 | 2,891 44 | 3,000 00 | 3,000 00 |
| Graves orchard, | 350 81 | 194 79 | 119 00 | – |

*Comparative Disbursements and Receipts, 1910-11* — Con.

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1910. | 1911. | 1910. | 1911. |
| Horticulture, | $1,530 18 | $1,439 97 | $2 37 | $4 36 |
| Library, | 289 62 | 161 56 | – | – |
| Meteorology, | 299 03 | 322 16 | – | – |
| Publications, | 1,953 86 | 1,726 40 | – | – |
| Salaries, | 31,438 00 | 33,899 31 | 15 52 | – |
| Treasurer's office, | 370 74 | 182 12 | – | – |
| Veterinary, | 218 64 | 238 16 | – | 5 00 |
| Hatch fund, | – | – | 15,000 00 | 15,000 00 |
| Adams fund, | – | – | 14,000 00 | 15,000 00 |
| State fund, | – | – | 10,500 00 | 10,500 00 |
| Tobacco experiments, | 317 78 | 340 20 | – | – |
| Cranberry association, | 544 17[1] | – | 544 17 | – |
| Expert services, | 12 40 | – | 85 00 | – |
| | $61,674 64 | $64,986 68 | $60,791 90 | $63,277 10 |
| Balance beginning of fiscal year, | – | – | 6,682 68 | 5,799 94 |
| Balance on hand Nov. 30, 1911, | 5,799 94 | 4,090 36 | – | – |
| | $67,474 58 | $69,077 04 | $67,474 58 | $69,077 04 |

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[1] Transferred to cranberry growers' contribution account.

## AGRICULTURAL DIVISION.

*Disbursements and Receipts for Fiscal Year ending Nov. 30, 1911.*

| | Disbursements. | Receipts. |
|---|---|---|
| Office, | $370 30 | $27 54 |
| Academic: — | | |
| Maintenance, | $120 25 | $10 10 |
| Equipment, | 103 95 | 1 50 |
| Miscellaneous, | 164 60 | – |
| Student labor, | 219 22 | – |
| | $608 02 | $11 60 |
| Farm: — | | |
| Labor, | $10,393 69 | $3,098 73 |
| Dairy, | 1,769 76 | 12,194 08 |
| Teams, | 527 12 | 125 00 |
| Horses, | 501 33 | 908 72 |
| Cattle, | 4,627 06 | 710 08 |
| Swine, | 199 29 | 151 15 |
| Field crops, | 1,037 92 | 1,518 33 |
| Repairs, | 538 67 | – |
| Improvements, | 282 19 | 20 |
| Student labor, | 1,164 00 | 9 84 |
| Contingent, | 119 34 | 16 91 |
| Tools, | 271 17 | 50 |
| Freight and express, | 96 06 | – |
| Poultry, | 282 48 | 279 69 |
| | $21,810 08 | $19,013 23 |
| Division totals, | $22,788 40 | $19,052 37 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | | $19,052 37 |
| By bills receivable, | | 1,167 78 |
| By net apportionment, | | 4,000 00 |
| To total disbursements, | $22,788 40 | |
| To bills payable, | 153 13 | |
| To balance, | 1,278 62 | |
| | $24,220 15 | $24,220 15 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1910. | Nov. 30, 1911. |
|---|---|---|
| Inventory of produce, | $4,999 13 | $4,728 73 |
| Inventory of cattle, | 10,042 00 | 10,823 00 |
| Inventory of swine, | 340 00 | 485 00 |
| Inventory of horses, | 4,400 00 | 4,080 00 |
| Inventory of poultry, | | 614 25 |
| | $19,781 13 | $20,730 98 |

## HORTICULTURAL DIVISION.

### *Disbursements and Receipts for Fiscal Year ending Nov. 30, 1911.*

| | Disbursements. | Receipts. |
|---|---|---|
| Floriculture, | $3,499 93 | $2,761 82 |
| Forestry, | 392 77 | 50 |
| General horticulture, | 2,585 00 | 659 80 |
| Grounds, | 1,900 61 | 1 70 |
| Landscape gardening, | 433 72 | 256 93 |
| Market gardening, | 4,413 12 | 2,293 74 |
| Pomology, | 3,425 41 | 1,156 58 |
| | $16,150 56 | $7,131 07 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | | $7,131 07 |
| By bills receivable, | | 861 39 |
| By apportionment, | | 10,250 00 |
| To total division disbursements, | $16,650 56 | |
| To bills payable, | 101 83 | |
| To balance, | 1,490 07 | |
| | $18,242 46 | $18,242 46 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1910. | Nov. 30, 1911. |
|---|---|---|
| Inventory of supplies, | $496 00 | $1,064 00 |

## INVENTORY — REAL ESTATE.

### *Land (Estimated Value).*

| | |
|---|---|
| Baker place, | $2,500 00 |
| Bangs place, | 2,350 00 |
| Clark place, | 4,500 00 |
| College farm, | 37,000 00 |
| Harlow farm, | 3,284 63 |
| Kellogg farm, | 5,868 45 |
| Louisa Baker place, | 5,636 91 |
| Old creamery place, | 1,000 00 |
| Pelham quarry, | 500 00 |
| Westcott place, | 2,250 00 |
| Allen place, | 500 00 |
| Charmbury place, | 450 00 |
| Loomis place, | 415 00 |
| Hawley & Brown place, | 675 00 |
| Newell farm, | 2,800 00 |
| | $69,729 99 |

### *College Buildings (Estimated Value).*

| | |
|---|---|
| Animal husbandry building, | $10,000 00 |
| Chemical laboratory, | 8,000 00 |
| Clark hall, | 67,500 00 |
| Cold-storage laboratory, | 12,000 00 |
| Dairy barn and storage, | 30,000 00 |
| Dining hall, | 35,000 00 |
| Drill hall and gun shed, | 10,000 00 |
| Durfee range and glass houses, old, | 10,000 00 |
| Durfee range and glass houses, new, | 15,000 00 |
| Entomology building, | 80,000 00 |
| Farmhouse, | 2,500 00 |
| French hall, | 17,000 00 |
| Horse barn, | 5,000 00 |
| Horticultural barn, | 2,500 00 |
| Horticultural tool shed, | 2,000 00 |
| Machinery barn, | 4,000 00 |
| Mathematical building, | 6,000 00 |
| North dormitory, | 25,000 00 |
| Physics laboratory, | 5,500 00 |
| Poultry feed house, | 1,400 00 |
| Poultry brooder house, | 1,000 00 |
| Poultry laying houses, | 1,300 00 |
| Poultry colony houses, | 470 00 |
| Power plant, | 13,000 00 |
| President's house, | 12,000 00 |
| Quarantine barn, | 200 00 |
| Small plant house, with vegetable cellar and cold grapery, | 4,700 00 |
| South dormitory, | 35,000 00 |
| Stone chapel, | 30,000 00 |
| Three houses on Stockbridge Road, | 5,000 00 |
| Veterinary laboratory and stable, | 23,500 00 |
| Waiting station, | 500 00 |
| Wilder hall, | 37,500 00 |
| Young stock barn, | 6,500 00 |
| | $519,070 00 |

### *College Equipment (Estimated Value).*

| | |
|---|---|
| Agricultural division: — | |
| Academic, | $3,901 80 |
| Dairy school, | 1,723 82 |
| Farm, | 26,687 05 |
| Agricultural education, | 711 95 |
| Botanical department, | 7,816 52 |
| Chemical laboratory, | 7,100 00 |
| College supplies, | 205 40 |
| Dean's office, | 108 50 |
| Dining hall, | 3,341 57 |
| Entomological laboratory, | 6,495 32 |
| Extension department, | 1,775 05 |
| Fire apparatus, | 950 10 |
| Floriculture, | 6,336 25 |
| Forestry, | 306 35 |
| General horticulture, | 9,448 65 |
| General maintenance, | 65,663 16 |
| Landscape gardening, | 4,462 61 |
| Language and literature, | 189 01 |
| Library, | 63,227 85 |
| Market gardening, | 893 59 |
| Military, | 1,207 22 |
| Pomology, | 2,130 28 |
| Physical education, | 2,142 33 |
| Physics and mathematics, | 5,443 94 |
| President's office, | 1,013 20 |
| Registrar's office, | 261 51 |
| Textbooks, | 307 45 |
| Treasurer's office, | 901 50 |
| Trophy room, | 1,273 85 |
| Veterinary laboratory, | 7,685 40 |
| Water mains, | 7,850 00 |
| Zoölogical laboratory, | 8,915 28 |
| Zoölogical museum, | 6,179 93 |
| | $256,656 44 |

### *Experiment Station Buildings (Estimated Value).*

| | |
|---|---|
| Agricultural laboratory and glass houses, | $15,000 00 |
| Agricultural barns, | 5,000 00 |
| Agricultural glass house, | 500 00 |
| Agricultural farmhouse, | 1,500 00 |
| Plant and animal chemistry laboratory, | 30,000 00 |
| Plant and animal chemistry barns, | 2,500 00 |
| Plant and animal chemistry dairy, | 2,000 00 |
| Six poultry houses, | 600 00 |
| Entomological laboratory and glass house, | 850 00 |
| | $57,950 00 |

### *Experiment Station Equipment (Estimated Value).*

| | |
|---|---|
| Agricultural laboratory, | $6,033 05 |
| Botanical laboratory, | 4,722 55 |
| Chemical laboratory, | 17,707 85 |
| Director's office, | 3,716 50 |
| Entomological laboratory, | 22,799 98 |
| Horticultural laboratory, | 1,120 00 |
| Meteorology laboratory, | 1,304 80 |
| Poultry department, | 409 85 |
| Treasurer's office, | 433 50 |
| Veterinary laboratory, | 80 00 |
| | $58,328 08 |

### *Inventory Summary.*

| | |
|---|---|
| Land, | $69,729 99 |
| College buildings, | 519,070 00 |
| College equipment, | 256,656 44 |
| Experiment station buildings, | 57,950 00 |
| Experiment station equipment, | 58,328 08 |
| | $961,734 51 |

## STUDENTS' TRUST FUND ACCOUNTS.

| | Disbursements for Year ending Nov. 30, 1911. | Receipts for Year ending Nov. 30, 1911. | Balance on Hand Nov. 30, 1911. | Balance brought forward Dec. 1, 1910. |
|---|---|---|---|---|
| Athletics, | $5,697 71 | $6,664 45 | $3,536 65 | $2,569 91 |
| Dining hall, | 37,436 23 | 42,191 68 | —1,690 80 | —6,446 25 |
| Louisa Baker estate, | 213 14 | – | – | 213 14 |
| Keys, | 23 00 | 24 50 | 30 50 | 29 00 |
| College signal, | 1,917 03 | 2,054 11 | 550 16 | 413 08 |
| Student deposits, | 4,481 93 | 4,897 98 | 554 55 | 138 50 |
| Creamery house, | 240 90 | 235 50 | 35 81 | 41 20 |
| Trophy room, | 506 66 | 839 00 | 608 57 | 276 23 |
| Harlow farm, | 262 11 | 125 00 | —164 63 | —27 52 |
| Text books, | 5,931 25 | 5,208 70 | 382 04 | 1,104 59 |
| Kellogg farm, | 169 93 | 137 50 | 35 69 | 68 12 |
| Y. M. C. A., | 12 35 | – | – | 12 35 |
| Musical association, | 70 82 | 40 00 | – | 30 82 |
| 1912 index, | 1,274 57 | 1,274 83 | 23 77 | 23 51 |
| Public speaking council, | 9 96 | 9 96 | – | – |
| Dramatic association, | 200 00 | 200 00 | – | – |
| Uniforms, | 3,652 23 | 2,160 15 | 239 62 | 1,731 10 |
| 1913 index, | 151 56 | 2,447 74 | 93 18 | – |
| | $62,251 38 | $66,308 10 | $6,090 54 | $6,651 56 |
| Balance on hand Dec. 1, 1910, | – | 178 39 | —1,855 43 | —6,473 77 |
| Balance on hand Nov. 30, 1911, | 4,235 11 | – | – | – |
| | $66,486 49 | $66,486 49 | $4,235 11 | $178 39 |

## DETAILED STATEMENT OF DINING HALL.

| | Liabilities. | Resources. |
|---|---|---|
| Dec. 1, 1910, overdraft, | $6,446 25 | – |
| Nov. 30, 1911, provisions purchased, | 37,436 23 | – |
| Nov. 30, 1911, outstanding bills, | 1,643 66 | – |
| Nov. 30, 1911, total collections, | – | $42,191 68 |
| Nov. 30, 1911, total collections outstanding, | – | 1,962 31 |
| Nov. 30, 1911, inventory, | – | 1,600 50 |
| Balance, | 228 35 | – |
| | $45,754 49 | $45,754 49 |

The average cost of board per week for the fiscal year was $3.86.

## ENDOWMENT FUND.[1]

| | Principal. | Income. |
|---|---|---|
| United States grant (5 per cent.), | $219,000 00 | $7,300 00 |
| Commonwealth grant (3½ per cent.), | 142,000 00 | 3,313 32 |
| | | $10,613 32 |

[1] This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

## BENEFICIARY FUNDS.

### *Burnham Emergency Fund.*

| | Market Value Dec. 1, 1911. | Par Value. | Income. |
|---|---|---|---|
| Two bonds American Telephone and Telegraph Company 4s, at $910, | $1,820 00 | $2,000 00 | $80 00 |
| Two bonds Western Electric Company 5s, at $1,020, | 2,040 00 | 2,000 00 | 100 00 |
| One bond United Fruit Company 5s, | – | – | 50 00 |
| On June 1, 1911: — The United Fruit Company's bond matured: we received, . $1,000 00 | | | |
| On Aug. 2, 1911: — We purchased the Newell land for pasture and made a partial payment of, . 800 00 | | | 200 00 |
| The balance was paid by the State. | | | |
| Unexpended balance Dec. 1, 1910, | – | – | 400 90 |
| | $3,860 00 | $4,000 00 | $830 90 |
| Disbursements for fiscal year ending Nov. 30, 1911, | – | – | 230 35 |
| Cash on hand Dec. 1, 1911, | – | – | $600 55 |

### *Library Fund.*

| | | | |
|---|---|---|---|
| Five bonds New York Central & Hudson River Railroad Company 4s, at $940, | $4,700 00 | $5,000 00 | $200 00 |
| Five bonds Lake Shore & Michigan Southern Railroad Company 4s, at $940, | 4,700 00 | 5,000 00 | 200 00 |
| Two shares New York Central & Hudson River Railroad Company stock, at $106, | 212 00 | 200 00 | 10 50 |
| Amherst Savings Bank, deposit, | 167 77 | 167 77 | 6 68 |
| | $9,779 77 | $10,367 77 | $417 18 |
| Transferred to College library account, | – | – | 417 18 |

## SPECIAL FUNDS.

### *Endowed Labor Fund (the Gift of a Friend of the College).*

| | Market Value Dec. 1, 1911. | Par Value. | Income. |
|---|---|---|---|
| Two bonds American Telephone and Telegraph Company 4s, at $910, | $1,820 00 | $2,000 00 | $80 00 |
| Two bonds Lake Shore & Michigan Southern Railroad Company 4s, at $940, | 1,880 00 | 2,000 00 | 80 00 |
| One bond New York Central Railroad debenture 4s, | 940 00 | 1,000 00 | 40 00 |
| Amherst Savings Bank, deposit, | 143 39 | 143 39 | 5 72 |
| One bond Metropolitan Street Railway, Kansas City Company 5s, at, | 980 00 | 1,000 00 | 50 00 |
| | $5,763 39 | $6,143 39 | $255 72 |
| Unexpended balance Dec. 1, 1910, | – | – | 986 39 |
| | – | – | $1,242 11 |
| One Kansas City Metropolitan Street Railway Bond, purchased Jan. 10, 1911, | – | – | 994 72 |
| Cash on hand Dec. 1, 1911, | – | – | $247 39 |

### *Whiting Street Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central debenture 4s, | $940 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, | 271 64 | 271 64 | 10 84 |
| | $1,211 64 | $1,271 64 | $50 84 |
| Unexpended balance Dec. 1, 1910, | – | – | 57 63 |
| | – | – | $108 47 |
| Disbursements for scholarships for fiscal year ending Nov. 30, 1911, | – | – | 90 00 |
| Cash on hand Dec. 1, 1911, | – | – | $18 47 |

### *Hills Fund.*

| | | | | |
|---|---|---|---|---|
| Northampton Institution for Savings, deposit, | | $1,180 00 | $1,180 00 | $44 66 |
| One bond American Telephone and Telegraph Company 4s, | | 910 00 | 1,000 00 | 40 00 |
| One bond New York Central & Hudson River Railroad debenture 4s, | | 940 00 | 1,000 00 | 40 00 |
| One bond New York Central & Hudson River Railroad debenture 3½s, | | 820 00 | 1,000 00 | 35 00 |
| Two bonds Metropolitan Street Railway of Kansas City 5s, at $980, | | 1,960 00 | 2,000 00 | 100 00 |
| Three bonds Pacific Telephone and Telegraph Company 5s, at $995, | | 2,985 00 | 3,000 00 | 150 00 |
| One bond Western Electric Company 5s, | | 1,020 00 | 1,000 00 | 50 00 |
| Boston & Albany Railroad stocks, at $221, | | 801 12 | 362 00 | 31 68 |
| Amherst Savings Bank, deposit, | | 72 75 | 72 75 | 2 88 |
| | | $10,688 87 | $10,614 75 | $494 22 |
| Unexpended balance Dec. 1, 1910, | | – | – | 618 46 |
| | | – | – | $1,112 68 |
| On Jan. 10, 1911: — | | | | |
| One bond of the Metropolitan Street Railway of Kansas City was purchased for | $994 72 | | | |
| Disbursements by floriculture and botanical departments for fiscal year ending Nov. 30, 1911, | 288 51 | | | 1,283 23 |
| Overdraft Dec. 1, 1911, | | – | – | $170 55 |

### *Mary Robinson Fund.*

| | Market Value Dec. 1, 1911. | Par Value. | Income. |
|---|---|---|---|
| Northampton Institution for Savings, deposit, | $820 00 | $820 00 | $31 04 |
| Boston & Albany Railroad stock, at $221, | 82 88 | 38 00 | 3 32 |
| | $902 88 | $858 00 | $34 36 |
| Unexpended balance Dec. 1, 1910, | – | – | 55 53 |
| Cash on hand Dec. 1, 1911, | – | – | $89 89 |

### *Grinnell Prize Fund.*

| | | | |
|---|---|---|---|
| Ten shares New York Central & Hudson River Railroad stock, | $1,060 00 | $1,000 00 | $52 50 |
| Unexpended balance Dec. 1, 1910, | – | – | 193 24 |
| | – | – | $245 74 |
| Disbursement for prizes, | – | – | 50 00 |
| Cash on hand Dec. 1, 1911, | – | – | $195 74 |

### *Gassett Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central & Hudson River Railroad debenture 4s, | $940 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, | 11 64 | 11 64 | 44 |
| | $951 64 | $1,011 64 | $40 44 |
| Unexpended balance Dec. 1, 1910, | – | – | 36 37 |
| | – | – | $76 81 |
| Disbursements for scholarships for fiscal year ending Nov. 30, 1911, | – | – | 66 30 |
| Cash on hand Dec. 1, 1911, | – | – | $10 51 |

### *Massachusetts Agricultural College (Investment).*

| | | | |
|---|---|---|---|
| One share New York Central & Hudson River Railroad stock, | $106 00 | $100 00 | $5 25 |
| Unexpended balance Dec. 1, 1910, | – | – | 50 20 |
| Cash on hand Dec. 1, 1911, | – | – | $55 45 |

### *Danforth Keyes Bangs Fund.*

| | | | |
|---|---|---|---|
| Two bonds Pacific Telephone and Telegraph Company 5s, at $995, | $1,990 00 | $2,000 00 | $100 00 |
| Two bonds Union Electric Light and Power Company 5s, at $990, | 1,980 00 | 2,000 00 | 100 00 |
| Two bonds American Telephone and Telegraph Company 4s, at $910, | 1,820 00 | 2,000 00 | 80 00 |
| Interest from student loans, | – | – | 6 28 |
| | $5,790 00 | $6,000 00 | $286 28 |
| Unexpended balance Dec. 1, 1910, | – | – | 345 29 |
| Cash on hand Dec. 1, 1911, | – | – | $631 57 |

### *John C. Cutter Fund.*

| | Market Value Dec. 1, 1911. | Par Value. | Income. |
|---|---|---|---|
| One bond Pacific Telephone and Telegraph Company 5s, | $995 00 | $1,000 00 | $50 00 |
| Unexpended balance Dec. 1, 1910, . . . . . | – | – | 28 33 |
| Cash on hand Dec. 1, 1911, . . . . . . | – | – | $78 33 |

## SUMMARY OF BALANCES ON HAND OF THE INCOME FROM FUNDS HELD IN TRUST BY THE MASSACHUSETTS AGRICULTURAL COLLEGE.

| | |
|---|---|
| Burnham emergency fund, . . . . . . . . . | $600 55 |
| Endowed labor fund, . . . . . . . . . | 247 39 |
| Whiting Street scholarship fund, . . . . . . . | 18 47 |
| Mary Robinson fund, . . . . . . . . . | 89 89 |
| Grinnell prize fund, . . . . . . . . . . | 195 74 |
| Gassett scholarship fund, . . . . . . . . . | 10 51 |
| Massachusetts Agricultural College investment, . . . . . | 55 45 |
| Danforth Keyes Bangs fund, . . . . . . . . | 531 57 |
| John C. Cutter fund, . . . . . . . . . | 78 33 |
| | $1,827 90 |
| Hills fund overdraft, . . . . . . . . . | 170 55 |
| | $1,657 35 |

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the treasurer, Fred C. Kenney, for the year ending Nov. 30, 1911. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHARLES A. GLEASON,
*Auditor.*

AMHERST, Dec. 12, 1911.

## HISTORY OF SPECIAL FUNDS.

| | |
|---|---|
| Burnham emergency fund: — A bequest from T. O. H. P. Burnham of Boston, made without any conditions. The trustees of the college have voted that the fund be kept intact, and that the income from it be used for the college for such purposes as they believe to be for its best interest, | $5,000 00 |
| Library fund: — The library of the college at the present time contains about 30,000 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave $2,000; Jan. 1, 1894, Charles L. Flint gave $1,000; in 1887 Elizur Smith of Lee, Mass., gave $1,215. These were the largest bequests, and amount now to . . | 10,000 00 |

| | |
|---|---|
| Endowed labor fund: — | |
| Gift of a friend of the college in 1901, income of which is to be used for the assistance of needy and deserving students, | $5,000 00 |
| Whiting Street scholarship: — | |
| Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship, | 1,000 00 |
| Hills fund: — | |
| Gift of Leonard M. and Henry F. Hills of Amherst, Mass., in 1867, to establish and maintain a botanic garden, | 10,000 00 |
| Mary Robinson fund: — | |
| Gift of Miss Mary Robinson of Medfield, in 1874 for scholarship, | 1,000 00 |
| Grinnell prize fund: — | |
| Gift of Hon. Wm. Claflin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York, | 1,000 00 |
| Gassett scholarship fund: — | |
| Gift of Henry Gassett of Boston, the income to be used for scholarship, | 1,000 00 |
| Massachusetts Agricultural College investment fund: — | |
| Investment made by vote of trustees, in 1893; to purchase one share New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate, | 100 00 |
| Danforth Keyes Bangs fund: — | |
| Gift of Louisa A. Baker of Amherst, Mass., April 14, 1909, the income thereof to be used annually in aiding poor, industrious and deserving students to obtain an education in said college, | 6,000 00 |
| John C. Cutter fund: — | |
| Gift of Dr. John C. Cutter of Worcester, Mass., an alumnus of the college, who died in August, 1909, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene, | 1,000 00 |
| | $41,100 00 |

### PRIZES.

| | |
|---|---|
| Sophomore prize in botany, given by Prof. A. V. Osmun of the department of botany, to that member of the sophomore class who presents the best herbarium in the regular course (this prize was first offered in 1908 with the hope that it might stimulate a greater interest on the part of the students in this line of work), — . . . . | $5 00 |
| Special prize, given by the Western Alumni Association to that member of the sophomore class who during his first two years has shown the greatest improvement in scholarship, character and example, . . . . . . | 25 00 |
| | $30 00 |

FRED C. KENNEY,
*Treasurer.*

# THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. IV. No. 4. For May, 1912.

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Public Document No. 31

# CATALOGUE

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE,

## 1911-1912.

## FORTY-NINTH ANNUAL REPORT.

## PART II.

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# MASSACHUSETTS AGRICULTURAL COLLEGE,

## AMHERST.

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# THE MASSACHUSETTS AGRICULTURAL COLLEGE.

This issue of the catalogue represents the status of the coll for the current college year, with provisional announcement courses of study and other matters for the year to follow.

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The college reserves, for itself and its departments, the right withdraw or change the announcements made in its catalogue.

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1911-12

# CALENDAR.

## 1912-13.

### REGULAR COURSES.

### 1912.

| | |
|---|---|
| uary 1, Monday, 1 P.M., . . . | Winter recess ends; chapel. |
| uary 29, Monday, . . . . | Semester examinations begin. |
| ruary 5, Monday, 1 P.M., . . | Second semester begins; chapel. |
| ruary 22, Thursday, . . . | Half holiday, Washington's Birthday. |
| rch 29, Friday, 6 P.M., . . . | Spring recess begins. |
| il 8, Monday, 1 P.M., . . . | Spring recess ends. |
| il 19, Friday, . . . . . | Half holiday, Patriot's Day. |
| y 30, Thursday, . . . . | Holiday, Memorial Day. |
| e 3, Monday, . . . . . | Senior examinations begin. |
| e 10, Monday, . . . . | Non-senior examinations begin. |
| e 15–19, Saturday–Wednesday, . | Commencement. |
| e 19–22, Wednesday–Saturday, . | Entrance examinations. |
| tember 4–7, Wednesday–Saturday, | Entrance examinations. |
| tember 11, Wednesday, 1.30 P.M., . | First semester begins; chapel. |
| ember 27–December 2, Wednesday, P.M.–Monday, 1.10 P.M., chapel. | |
| ember 20, Friday, 6 P.M., . . | Winter recess begins. |

### 1913.

| | |
|---|---|
| uary 6, Monday, 1.10 P.M., . . | Winter recess ends; chapel. |
| uary 24, Friday, . . . . | Semester examinations begin. |
| ruary 3, Monday, 1.10 P.M., . . | Second semester begins; chapel. |
| rch 28, Friday, 6 P.M., . . . | Spring recess begins. |
| ril 7, Monday, 1.10 P.M., . . . | Spring recess ends. |
| y 30, Friday, . . . . . | Holiday, Memorial Day. |
| y 31, Saturday, . . . . | Senior examinations begin. |
| e 7, Saturday, . . . . | Non-senior examinations begin. |
| e 14–18, Saturday–Wednesday, . | Commencement. |
| e 18–21, Wednesday–Saturday, . | Entrance examinations. |

# MASSACHUSETTS AGRICULTURAL COLLEGE.

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HISTORY. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of the various buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the federal station, and subsequently the whole was incorporated with the college.

COURSES. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-years course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science and doctor of philosophy. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and farmers' week. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, railway and trolley specials, lecture courses, demonstrations, etc.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, for scientific experts in chemistry, entomology and botany, and for business operations having connection with practical agriculture.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, physics and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which major courses are offered.

LOCATION AND EQUIPMENT. — The agricultural college is located in the town of Amherst. The grounds comprise more than 500 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

# THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

# THE CORPORATION.

## MEMBERS OF THE CORPORATION.

| | TERM EXPIRES |
|---|---|
| DAVIS R. DEWEY of Cambridge, | 1912 |
| M. FAYETTE DICKINSON of Brookline, | 1912 |
| WILLIAM H. BOWKER of Concord, | 1913 |
| GEORGE H. ELLIS of West Newton, | 1913 |
| CHARLES E. WARD of Buckland, | 1914 |
| ELMER D. HOWE of Marlborough, | 1914 |
| NATHANIEL I. BOWDITCH of Framingham, | 1915 |
| WILLIAM WHEELER of Concord, | 1915 |
| ARTHUR G. POLLARD of Lowell, | 1916 |
| CHARLES A. GLEASON of New Braintree, | 1916 |
| FRANK GERRETT of Greenfield, | 1917 |
| HAROLD L. FROST of Arlington, | 1917 |
| CHARLES H. PRESTON of Danvers, | 1918 |
| FRANK A. HOSMER of Amherst, | 1918 |

## MEMBERS EX OFFICIO.

His Excellency Governor EUGENE N. FOSS, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
DAVID SNEDDEN, *State Commissioner of Education.*
J. LEWIS ELLSWORTH, *Secretary of the State Board of Agriculture.*

## OFFICERS OF THE CORPORATION.

His Excellency Governor EUGENE N. FOSS of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
J. LEWIS ELLSWORTH of Worcester, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

## STANDING COMMITTEES OF THE CORPORATION.[1]

### *Committee on Finance.*

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
CHARLES E. WARD.
FRANK A. HOSMER.

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[1] The president of the college is *ex officio* member and secretary of standing committees.

### *Committee on Course of Study and Faculty.*

William Wheeler, *Chairman.*
William H. Bowker.
M. Fayette Dickinson.
David Snedden.
Elmer D. Howe.
Davis R. Dewey.
Frank A. Hosmer.

### *Committee on Farm.*

Nathaniel I. Bowditch, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
George H. Ellis.

### *Committee on Horticulture.*

J. Lewis Ellsworth, *Chairman.*
Davis R. Dewey.
Elmer D. Howe.
Harold L. Frost.

### *Committee on Experiment Department.*[1]

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
Arthur G. Pollard.
Charles E. Ward.
Harold L. Frost.

### *Committee on Buildings and Arrangement of Grounds.*

William H. Bowker, *Chairman.*
William Wheeler.
Frank Gerrett.
M. Fayette Dickinson.
Charles H. Preston.

### *Examining Committee of Overseers.*

John Bursley of West Barnstable.
Frank P. Newkirk of Easthampton.
William E. Patrick of Warren.
John J. Erwin of Wayland.
R. Henry Race of North Egremont.

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[1] The director of the experiment station is a member of the committee on experiment department, without vote.

# OFFICERS OF THE INSTITUTION.

## THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

KENYON L. BUTTERFIELD, A.M., LL.D., . . . President's House.
President of the College and Head of Division of Rural Social Science.

GEORGE F. MILLS, A.M., . . . . . . . 46 Amity Street.
Dean of the College and Professor of Languages and Literature.

CHARLES H. FERNALD, Ph.D., . . . . . . . 3 Hallock Street.
Honorary Director of the Graduate School.

WILLIAM P. BROOKS, Ph.D., . . . . . 28 Northampton Road.
Director of the Experiment Station and Lecturer on Soil Fertility.

WILLIAM D. HURD, M.Agr., . . . . . . . 82 Pleasant Street.
Director of the Extension Service.

FRANK A. WAUGH, M.Sc., . . . Massachusetts Agricultural College.
Head of Division of Horticulture and Professor of Landscape Gardening.

JAMES A. FOORD, M.Sc., . . . . . . . . Nutting Avenue.
Head of Division of Agriculture and Professor of Farm Administration.

ROBERT J. SPRAGUE, Ph.D., . . . . . . . . North Amherst.
Head of Division of the Humanities and Professor of Economics and Sociology.

JOSEPH B. LINDSEY, Ph.D., . . . . . . . 47 Lincoln Avenue.
Goessman Professor of Chemistry.

CHARLES WELLINGTON, Ph.D., . . . . . . . 34 Amity Street.
Professor of Chemistry.

JAMES B. PAIGE, B.Sc., D.V.S., . . . . . . 42 Lincoln Avenue.
Professor of Veterinary Science, Chairman of Division of Science.

GEORGE E. STONE, Ph.D., . . . . . . . . Mount Pleasant.
Professor of Botany.

PHILIP B. HASBROUCK, B.Sc., . . . . . . 130 Pleasant Street.
Professor of Physics and Registrar of the College.

JOHN E. OSTRANDER, A.M., C.E., . . . . 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

HENRY T. FERNALD, Ph.D., . . . . . . . . 44 Amity Street.
Professor of Entomology and Acting Director of the Graduate School.

GEORGE C. MARTIN, C.E., Captain 18th U. S. Infantry,
35 North Prospect Street.
Professor of Military Science and Tactics.

Edward A. White, B.S., . . . . . . . . Mount Pleasant.
Professor of Floriculture.
William R. Hart, A.M., . . . . . . . 97 Pleasant Street.
Professor of Agricultural Education.
Fred C. Sears, M.Sc., . . . . . . . . Mount Pleasant.
Professor of Pomology.
Fred C. Kenney, . . . . . . . . Mount Pleasant.
Treasurer of the College.
Robert W. Neal, A.M., . . . . . . . 7 Woodside Avenue.
Associate Professor of English.
Joseph S. Chamberlain, Ph.D., . . . . 16 North Prospect Street.
Associate Professor of Organic and Agricultural Chemistry.
William P. B. Lockwood, B.Sc.Agr., . . 5 East Pleasant Street.
Associate Professor of Dairying.
Elmer K. Eyerly, A.M., . . . . . . . Amity Street.
Associate Professor of Rural Sociology.
Frederick F. Moon, A.B., M.F., . . . . . . 6 Allen Street.
Associate Professor of Forestry.
John A. McLean, A.B., B.Sc.Agr., . . . . . Prospect House.
Associate Professor of Animal Husbandry.
John C. Graham, B.Sc., . . . . . . . . North Amherst.
Associate Professor of Poultry Husbandry.
Guy C. Crampton, Ph.D., . . . . . . . 86 Pleasant Street.
Associate Professor of Entomology.
S. Francis Howard,[1] M.Sc., . . . . . . 10 Allen Street.
Assistant Professor of Chemistry.
A. Vincent Osmun, M.Sc., . . . . . . . . North Amherst.
Assistant Professor of Botany.
Sidney B. Haskell, B.Sc., . . . . . . . 5 Fearing Street.
Assistant Professor of Agronomy.
Clarence E. Gordon, Ph.D., . . . . . . . Nutting Avenue.
Assistant Professor of Zoölogy and Geology.
Edgar L. Ashley, A.M., . . . . . . . . Prospect House.
Assistant Professor of German.
Anderson A. Mackimmie, A.B., . . . . . . . Nutting Avenue.
Assistant Professor of French.
Alexander E. Cance, Ph.D., . . . . . . 9 Fearing Street.
Assistant Professor of Agricultural Economics.
Burton N. Gates, Ph.D., . . . . . . . 42 Lincoln Avenue.
Assistant Professor of Beekeeping.
Edward M. Lewis, A.M., . . . . . . . . 29 Amity Street.
Assistant Professor of English and Assistant Dean of the College.
Charles A. Peters, Ph.D., . . . . . . . . 6 High Street.
Assistant Professor of Inorganic and Soil Chemistry.
Curry S. Hicks, B.Sc., . . . . . . . . . 8 Allen Street.
Assistant Professor of Physical Education and Hygiene.
Frederick L. Yeaw, B.Sc., . . . . . . 25 North Prospect Street.
Assistant Professor of Market Gardening.

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[1] On leave of absence.

George S. Gage, Ph.D., . . . . . . 42 Lincoln Avenue.
Assistant Professor of Animal Pathology.

George N. Holcomb, A.B., S.T.B., . . . . . . . Bolton.
Lecturer in History.

Frank W. Rane, M.F., . . . . . . . . Boston.
Lecturer in Forestry.

C. Robert Duncan, B.Sc., . . . . . . 31 North Prospect Street.
Instructor in Mathematics.

Charles R. Green, B.Agr., . . . . . . . Mount Pleasant.
Librarian.

Alvah J. Norman, M.Sc., . . . . . . 7 Phillips Street.
Extension Instructor in Pomology.

George F. E. Story, B.Sc., . . . . . . . 10 Allen Street.
Extension Instructor in Dairying.

Arthur K. Harrison, . . . . . . . . . 8 Allen Street.
Instructor in Landscape Gardening.

Chester A. Butman, B.Sc., . . . . . . Prospect House.
Instructor in Physics.

Willard A. Wattles, A.M., . . . . . . Mount Pleasant.
Instructor in English.

William L. Harmount, A.B., . . . . . . . Nutting Avenue.
Instructor in French.

Elvin L. Quaife, B.Sc.Agr., . . . . . . . 9 Fearing Street.
Instructor in Animal Husbandry.

William L. Machmer, A.M., . . . . . . . Kendrick Place.
Instructor in Mathematics.

Arthur N. Julian, B.A., . . . . . . . 50 Pleasant Street.
Instructor in German.

Howard DeF. Widger, B.A., . . . . . . . 13 Spring Street.
Instructor in English and Public Speaking.

Willard A. Turner, Ph.B., . . . . . . . 31 Amity Street.
Assistant in Chemistry.

Helena Goessmann, Ph.M., . . . . . . . 44 Amity Street.
Assistant in English.

Samuel R. Parsons, B.Sc., . . . . . . . 9 Fearing Street.
Assistant in Mathematics and in Military Science.

Frederick A. McLaughlin, B.Sc., . . . . . 120 Pleasant Street.
Assistant in Botany.

Herbert J. Baker, B.Sc., . . . . . . . . . —— ——
Assistant in Agronomy.

Harold S. Adams, B.A., . . . . . . 32 North Prospect Street.
Assistant in Chemistry.

## Graduate Assistants.

Leonard S. McLaine, B.Sc., . . . . . . 84 Pleasant Street.
Assistant in Zoölogy.

Marcus T. Smulyan, B.Sc., . . . . . . . Nutting Avenue.
Assistant in Botany.

William S. Regan, B.Sc., . . . . . . 84 Pleasant Street.
Assistant in Entomology.
Raymond G. Smith, B.Sc., . . . . . 5½ East Pleasant Street.
Assistant in Botany.

## Other College Officers.

Edwin H. Forristall, M.Sc., . . Massachusetts Agricultural College.
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Electrician.
P. C. Schroyer, . . . . . . . . . 120 Pleasant Street.
Assistant Engineer.
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Superintendent of Buildings.
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Steward, Dining Hall.
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Clerk, President's Office.
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Stenographer, Division of Agriculture.
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Clerk to the Dean and Registrar.
Miss Helen V. Gaskell, . . . . . . . . 105 Main Street.
Stenographer, Division of Floriculture.
Miss Lina Fisher, . . . . . . . . . . —— ——
Stenographer, Department of Chemistry.
Miss Gladys E. Russell, . . . . . . . . . —— ——
Stenographer, Division of Horticulture.

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Director.
Earnest D. Waid, B.Agr., . . . . . . 17 Fearing Street.
Assistant Director.

| | |
|---|---|
| Charles H. White, B.Sc., Field Agent. | North Uxbridge. |
| Alvah J. Norman, B.Sc., Horticulture. | 7 Phillips Street. |
| George F. E. Story B.Sc., Dairying and Animal Husbandry. | 10 Allen Street. |
| Miss Mabel R. Case, Clerk to the Director. | Draper Hall. |

# Officers of the Experiment Station.

| | |
|---|---|
| William P. Brooks, Ph.D.,<br>Director. | 28 Northampton Road. |
| Joseph B. Lindsey, Ph.D.,<br>Vice-Director. | 47 Lincoln Avenue. |
| Fred C. Kenney,<br>Treasurer. | Mount Pleasant. |
| Charles R. Green, B.Agr.,<br>Librarian. | Mount Pleasant. |

## Department of Plant and Animal Chemistry.

| | |
|---|---|
| Joseph B. Lindsey, Ph.D.,<br>Chemist. | 47 Lincoln Avenue. |
| Edward B. Holland, M.Sc.,<br>Associate Chemist, in charge of Research Division. | 28 North Prospect Street. |
| Fred W. Morse, Ph.D.,<br>Research Chemist. | 44 Pleasant Street. |
| Henri D. Haskins, B.Sc.,<br>In charge of Fertilizer Division. | Amherst House. |
| Philip H. Smith,<br>In charge of Feed and Dairy Division. | 102 Main Street. |
| Lewell S. Walker, B.Sc.,<br>Assistant. | 19 Phillips Street. |
| James C. Reed, B.Sc.,<br>Assistant. | Nutting Avenue. |
| Rudolf W. Ruprecht, B.Sc.,<br>Assistant. | 31 Amity Street. |
| George R. Pierce,<br>Assistant. | North Amherst. |
| Carelton P. Jones,<br>Assistant. | —— —— |
| Joseph P. Howard,<br>Collector. | North Amherst. |
| Harry J. Allen,<br>Assistant. | Amherst. |
| James R. Alcock,<br>Assistant in Animal Nutrition. | North Amherst. |

## DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., . . . . . 28 Northampton Road.
Agriculturist.
H. J. FRANKLIN, Ph.D., . . . . . . . . . Wareham.
In charge of Cranberry Investigation.
EDWIN F. GASKILL, B.Sc., . . . . . . . North Amherst.
Assistant Agriculturist.

## DEPARTMENT OF HORTICULTURE.

FRANK A. WAUGH, M.Sc., . . . Massachusetts Agricultural College.
Horticulturist.
FRED C. SEARS, M.Sc., . . . . . . . . Mount Pleasant.
Pomologist.
JACOB K. SHAW, Ph.D., . . . . . . . . 1 Allen Street.
Assistant Horticulturist.

## DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

GEORGE E. STONE, Ph.D., . . . . . . . Mount Pleasant.
Botanist and Vegetable Pathologist.
GEORGE H. CHAPMAN, M.Sc., . . . . . . 13 Fearing Street.
Assistant Botanist.
EDWARD A. LARRABEE, B.Sc., . . . . . . . . Clark Hall.
Assistant Botanist.

## DEPARTMENT OF ENTOMOLOGY.

HENRY T. FERNALD, Ph.D., . . . . . . . 44 Amity Street.
Entomologist.
BURTON N. GATES, Ph.D., . . . . . . 42 Lincoln Avenue.
Apiarist.
ARTHUR I. BOURNE, B.A., . . . . . 66 North Pleasant Street.
Assistant in Entomology.

## DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., . . . . . 42 Lincoln Avenue.
Veterinarian.

## DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., . . . 35 North Prospect Street.
Meteorologist.
ROYAL N. HALLOWELL, . . . . Massachusetts Agricultural College.
Observer.

## OTHER OFFICERS OF THE EXPERIMENT STATION.

HERBERT J. BAKER, . . . . Massachusetts Agricultural College.
Secretary to the Director.
MRS. LUCIA G. CHURCH, . . . . . . . 4 Hallock Street.
Stenographer, Director's Office.

Miss F. Ethel Felton, . . . . . . . . 9 Phillips Street.
Stenographer, Department of Plant and Animal Chemistry.
Miss Bridie O'Donnell, . . . . . . . . . . Hadley.
Stenographer, Department of Entomology.
Miss Alice M. Howard, . . . . . . . . North Amherst.
Stenographer, Department of Plant and Animal Chemistry.
Miss Jessie V. Crocker, . . . . . . . . . Sunderland.
Stenographer, Department of Botany.

# COMMITTEES OF THE FACULTY.[1]

## 1911-12.

### CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.
Associate Professor EYERLY.
Assistant Professor CANCE.

### COMMENCEMENT.

Professor PAIGE.
Professor WELLINGTON.
Captain MARTIN.
Professor WHITE.
Mr. KENNEY.
Mr. DUNCAN.

### COURSE OF STUDY.

Professor HART.
Professor WAUGH.
Professor FOORD.
Professor SPRAGUE.
Professor OSTRANDER.
Associate Professor CHAMBERLAIN.

### DISCIPLINE (ADVISORY).

Professor MILLS.
Professor HASBROUCK.
Captain MARTIN.
Assistant Professor GORDON.
Assistant Professor MACKIMMIE.
Assistant Professor LEWIS.

### EMPLOYMENT.

Professor SEARS.
Mr. KENNEY.
Assistant Professor HASKELL.

### ENTRANCE EXAMINATIONS AND ADMISSION.

Professor HASBROUCK.
Assistant Professor OSMUN.
Assistant Professor ASHLEY.
Assistant Professor PETERS.
Mr. MACHMER.
Mr. WATTLES.

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[1] The president of the college is ex officio member of these standing committees.

## GRADUATE SCHOOL.

Professor FERNALD.
    Professor LINDSEY.
    Professor PAIGE.
    Professor STONE.
    Professor SEARS.
    Assistant Professor GORDON.

## LIBRARY.

Professor STONE.
    Professor BROOKS.
    Professor WELLINGTON.
    Assistant Professor CANCE.

## PHYSICAL EDUCATION AND ATHLETICS.

Professor PAIGE.
    Assistant Professor LEWIS.
    Assistant Professor HICKS.

## SCHEDULE.

Professor OSTRANDER.
    Associate Professor NEAL.
    Associate Professor LOCKWOOD.

## SCHOLARSHIP.

Assistant Professor GORDON.
    Professor MILLS.
    Professor HASBROUCK.
    Assistant Professor MACKIMMIE.
    Assistant Professor LEWIS.

## STUDENT LIFE.

Professor HURD.
    Associate Professor CHAMBERLAIN.
    Associate Professor MCLEAN.
    Assistant Professor HASKELL.
    Assistant Professor MACKIMMIE.
    Assistant Professor LEWIS.
    Assistant Professor HICKS.

## UNCLASSIFIED STUDENTS.

Professor WHITE.
    Associate Professor LOCKWOOD.
    Assistant Professor PETERS.

# THE COLLEGE.

# ADMISSION.

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## A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege on or before June 1 of the year in which examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

## B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be met by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.
2. By presenting certificate from any school approved by the college entrance examination boards.
3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.[1]

*Places of Examination.* — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall.

In September, examinations will be held in Amherst only.

*Schedule for Entrance Examinations, June 21–24, 1912.* — The examinations in June will follow this schedule: —

*First Day.*

| | |
|---|---|
| 1 P.M. | Registration.[2] |
| 1.15–5 P.M. | Latin (A and B). |

*Second Day.*

| | |
|---|---|
| 8 A.M. | Plane geometry. |
| 10 A.M. | Chemistry. |
| 11.30 A.M. | United States history and civics. |
| 2 P.M. | Algebra. |
| 3.30 P.M. | Physics. |
| 4.30 P.M. | Elective English. |

*Third Day.*

| | |
|---|---|
| 8 A.M. | Required English. |
| 11 A.M. | Solid geometry, agriculture. |
| 2 P.M. | History, required and elective. |
| 5 P.M. | Botany. |

*Fourth Day.*

| | |
|---|---|
| 8 A.M. | French, German, required and elective. |
| 1 P.M. | Greek, and all one-half credit electives, except those already noted. |

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[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects applicants may be admitted, upon examination, with a condition in English, provided that they show, upon examination, satisfactory preparation in work entitling them to a ranking of 60 or higher.

The purpose of this provision is to avoid the possible injustice of excluding, without further trial, applicants who appear to be deficient in preparation in only one subject.

Attention is called to the standing rule of the uniform entrance requirement bodies concerning English as an admission subject: namely, that applicants whose work is seriously lacking in correct spelling, punctuation, grammar or other elementary essentials of good usage will be rejected.

Students so admitted, must, to remove the condition, pass an examination covering the regular 3-units requirement.

[2] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

*Schedule for Entrance Examinations in September.* — In September, 1912, the examinations will be given September 11–14, inclusive, and will follow the order indicated for June, beginning September 11 at 1 P.M.

## C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of four or five recitations a week for a school year. Neither more nor less credit will be given in any subject than is indicated in the table below. Fourteen units must be offered for admission, of which nine are required and five are elective.[1]

(*a*) The following nine units are required: —

*Language.*

| | |
|---|---|
| English, | 3 |
| French or German, | 2 |

*History and Civics.*[2]

| | |
|---|---|
| United States history and civics, | ½ |
| History (elective), | 1 |
| (*a*) Ancient history. | |
| (*b*) Medieval and modern history. | |
| (*c*) English history. | |
| (*d*) General history. | |

*Mathematics.*

| | |
|---|---|
| Algebra, through progressions, | 1½ |
| Plane geometry, | 1 |

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

*Language.*

| | |
|---|---|
| English in addition to requirements, | 1 |
| French in addition to requirements, | 2 or 1[3] |
| German in addition to requirements, | 2 or 1[3] |

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[1] After September, 1913, the entrance credits will be divided as follows: 8½ from group A, 5½ from group B.

[2] Hereafter one unit in history will be required. In group (*a*) of the requirement for entrance United States history and civics will be put on the same basis with the other history requirement.

[3] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

| | |
|---|---|
| Greek, | 2 or 3 |
| Latin, | 2 or 3 |

Latin A, including Cæsar and Cicero or prose composition, 2; Latin B, including Virgil and prose composition, 1.

*History.*

| | |
|---|---|
| In addition to requirements, | 1, 2, or 3 |

*Mathematics, and Other Sciences.*

| | |
|---|---|
| Solid geometry, | ½ |
| Trigonometry, | ½ |
| Chemistry, | 1 |
| Physiography, | ½ |
| Physiology, | ½ |
| Agriculture,[1] | ½ or 1 |
| Botany,[1] | ½ or 1 |
| Geology,[1] | ½ |
| Physics,[1] | 1 |
| Zoölogy,[1] | ½ |
| Commercial geography,[2] | ½ |
| Drawing,[2] | ½ |
| Manual training,[2] | ½ or 1 |

**PRESENTATION OF NOTE-BOOKS.—The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 1).**

**Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificate should not present note-books; but their certificate must state that note-books have been satisfactorily completed.**

## D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.[3]

**In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address sub-station 84, New York City.**

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. The examination in agriculture will be given in September only.

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[1] Note-book required as part of preparation will be credited as part of the examination.

[2] Certification necessary in these subjects; no examinations given.

[3] In alphabetical order by subjects.

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

Commercial Geography. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

Drawing. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

English. — Preparation in English should develop in the candidate (1) ability to express himself well and correctly in his mother tongue, and (2) ability to penetrate through language to the meaning that underlies it.

All candidates for admission — whether by examination or by certification — are urged to secure a thorough training in composition, in which at least part of the subjects written on shall be derived from personal observation, experience and thought. They are urged to cultivate especially, in all their writing, the habit of correctness in spelling, grammar, punctuation, sentence structure and paragraph building. This habit will be of much greater help to them in their work in the college than will mere knowledge of the prescribed books.

In the examination, direct questions may be put, including questions upon grammar. Several compositions, each about one hundred and fifty words long, will be required, including papers to test the candidate's ability to think and write clearly, either on matters involving personal experience or on topics involving knowledge of the books. All candidates received as members of the freshman class are expected to be able — as a result of their study of the books prescribed "For Study and Practice" — to paraphrase or interpret, with some insight, unfamiliar verse or prose of medium difficulty, in which the meaning does not depend on anything outside the passage itself; and, as part of every examination, at least one passage is given for such interpretation.

The list of books for 1912 is made up from the list recommended by the Conference on Uniform Entrance Requirements in English. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of June preceding the examinations.

For 1912: —

(*a*) For reading and composition practice: Shakspere's "As You Like It" and "Julius Cæsar;" Franklin's "Autobiography;" Goldsmith's "The Deserted Village;" Dickens's "A Tale of Two Cities;" George Eliot's "Silas Marner;" Irving's "Sketch Book;" Scott's "The Lady of the Lake;" Byron's "Mazeppa" and "The Prisoner of Chillon;" and Macaulay's "Lays of Ancient Rome."

(*b*) For thorough study and practice: Shakspere's "Macbeth;" Milton's "Comus," "L'Allegro" and "Il Penseroso," or Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

For 1913, 1914, 1915: —

*English Grammar and Composition.* — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

*Literature.* — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home

Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

*Examination.*[1] — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

The second part of the examination will include composition and those books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

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[1] Read in connection with this statement the first three paragraphs under "English," pp. 29, 30.

ENGLISH, ELECTIVE. — To secure a fourth entrance credit in English, the applicant should do (*a*) the full equivalent of three years' work (required English), and also (*b*) the full equivalent of a fourth year's work. Applicants not certified with a fourth entrance credit will be examined. In order, however, that examination questions may be prepared, the applicant for examination should notify the Department of English by the first of June preceding the examinations, stating which English subject or subjects he wishes to present.

*Subjects accepted.* — The applicant may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.

(*b*) History of English literature (or lives of the great authors).

(*c*) Classics *other than those read to meet the three-credit requirement, the applicant to present a complete list of his readings for all four years.* The reading for the fourth credit should be of the same detailed, careful kind as is given the books prescribed for "Reading and Practice" in the official list of entrance requirement readings.

(*d*) Advanced composition.

(*e*) History of the English language.

(*f*) Advanced high school grammar.

*Advanced Standing in College.* — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board, for freshmen who wish to apply for advanced standing.

*Presentation of Note-books and Themes.* — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

GREEK. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

HISTORY.[1] — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

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[1] Hereafter one unit in history will be required, United States history and civics being placed upon the same basis with the other history requirement.

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

### E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

### F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.
5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.
6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

9. All requests for information concerning admission of unclassified students should be addressed to Prof. E. A. White, chairman of committee on unclassified students.

## G. Unclassified Students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

# COURSES OF INSTRUCTION.

## A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

### FRESHMAN YEAR.

#### *First Semester.*

[All work required.]

| | |
|---|---|
| Chemistry, | 3 |
| Algebra, | 3 |
| Solid geometry,[1] | 2 |
| English, | 4 |
| Public speaking (at option of instructor), | 1 |
| French or German,[2] | 4 |
| Drill, | 1 |
| Hygiene, | 1 |
| College life (attendance without credit). | |
| | 18 or 19 |

#### *Second Semester.*

[All work required.]

| | |
|---|---|
| Animal husbandry, | 2 |
| Chemistry, | 3 |
| Trigonometry, | 3 |
| Algebra, | 2 |
| English, | 4 |
| Public speaking (if not taken in semester [1]), | 1 |
| French or German, | 4 |
| Drill, | 1 |
| Physical education, | 1 |
| | 20 or 21 |

### SOPHOMORE YEAR.

#### *First Semester.*

[All work required.]

| | |
|---|---|
| Agronomy, | 3 |
| Physics, | 5 |
| Zoölogy, | 3 |
| English, | 2 |
| French or German, | 3 |
| Tactics, | 1 |
| Drill, | 1 |
| | 18 |

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[1] To be taken in course when not offered for entrance.

[2] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

### *Second Semester.*

[All courses under "Required," with any two of those under "Elective."]

[Required.]

| | |
|---|---|
| Elementary horticulture, | 2 |
| Botany, | 4 |
| English, | 2 |
| Agricultural industry, | 3 |
| Drill, | 1 |
| Tactics, | 1 |
| Physical education, | 1 |
| | 14 |

[Elective.]

| | | |
|---|---|---|
| French or German,<br>Animal husbandry,<br>Geology,<br>Physics,<br>Chemistry,<br>Surveying, | Each 3 hours. Any two, | 6 |
| | | 20 |

### JUNIOR AND SENIOR YEARS.

[Effective to June, 1912, only.]

In the junior and in the senior year, work must be taken each semester amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

| | |
|---|---|
| Military science, two credits each semester of junior year, | 4 |
| Physical education, one credit (second semester), | 1 |
| Political science (Course 1, Economics), | 3 |
| English, | 3 |

[Elective.]

Unless otherwise stated, elective courses to the end of the college year of 1911–12 are open to both juniors and seniors. Elections are subject to such provisions as either the faculty or the instructors in the courses may declare.

## MAJORS.

Beginning with September, 1912, a plan of major courses will become operative. For statement, see Addendum.

## STARRED COURSES.

Courses the number of which is marked with a star are announced provisionally only.

## B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 10, page 10 of the Rules.]

## DIVISION OF AGRICULTURE.

Professor Foord.

### AGRONOMY.

Assistant Professor Haskell, Dr. Brooks, Mr. Baker.

*Required Course.*

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 lecture hours. Credit, 3.
Assistant Professor Haskell.

*Elective Courses.*

3. Field and Forage Crops. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Assistant Professor Haskell.

4. Advanced Field Crops. — This course takes up the question of breeding and improvement of the crops studied in Agronomy 3; study of seed stock as offered in the market, testing of germination, purity and estimation of valuation; and the methods of production, harvesting and curing. Prerequisites, Agronomy 3 and Botany 2. Juniors and seniors; 1 laboratory period and 2 lecture periods weekly. Credit, 3. Assistant Professor Haskell.

5. Advanced Soils. — A field, laboratory and lecture course on soils; their nature, composition, physical qualities, improvement. Field work, as far as the season allows, consists of detailed soil surveys in different parts of the Connecticut valley; this followed by laboratory work on the physical properties of the soil collected, on the effect of fertilizers on the soil, and on the mixing of fertilizers. Prerequisites, Agronomy 1 and Chemistry 2. Juniors and seniors; 1 lecture period and 1 four-hour laboratory period weekly. Credit, 3.
Assistant Professor Haskell.

6. Drainage and Irrigation. — A field and lecture course on soil improvement, by drainage and irrigation. As a thesis each man is required to take an area of wet or swampy land and to present plans and estimates for its reclamation. Prerequisites, Agronomy 1 and Mathematics 8.. Juniors and seniors; 1 four-hour laboratory period and 1 lecture period weekly. Credit, 3.
Assistant Professor Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. For seniors only. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. Brooks.

## ANIMAL HUSBANDRY.

Associate Professor McLean, Mr. Quaife.

### *Required Courses.*

2. Elementary Judging. — A study of the different market classes and grades of horses, cattle, sheep and swine. The purpose of this course is to familiarize beginners with the different classes of stock, and to give them a grounding in live-stock judging. Textbook, Craig's "Live Stock Judging." Freshmen; 2 judging laboratories each week. Credit, 2.
Associate Professor McLean and Mr. Quaife.

*Elective Courses.*

3. Breeds and Types of Live Stock.[1] — A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Prerequisite, Animal Husbandry 2. Text-book, Plumb's "Breeds and Types of Farm Animals." Sophomores; 1 lecture and 2 laboratories. Credit, 3.
Associate Professor McLean and Mr. Quaife.

5. Principles of Breeding. — Prerequisite, Zoölogy 1. Text-book, Davenport's "Principles of Breeding." Juniors; 3 lectures. Credit, 3.
Associate Professor McLean.

6. Live-stock Management. — The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, breaking to drive, driving, harnessing, casting, and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work. Prerequisite, Animal Husbandry 4. Juniors; 1 laboratory. Credit, 1.
Mr. Quaife.

8. Advanced Stock Judging. — This course is designed to equip Animal Husbandry students in the judging of classes of different types of live stock, to strengthen them in the selection of superior sires, and equip them for stock judging at fairs. Visits will be made to the best herds of the various breeds of stock in the State. Judging teams to represent the college will be largely selected from this class. Prerequisite, Animal Husbandry 4. Juniors; 2 laboratory periods. Credit, 2.
Associate Professor McLean.

9. Feeding and Management. — A study of the principles of animal nutrition; of the composition and qualities of feeding materials; of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production; a similar study of beef animals and beef production. Prerequisite, Animal Husbandry 4. Text-book, Henry's "Feeds and Feeding." Three lectures. Credit, 3.
Associate Professor McLean.

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[1] Formerly Course 4; will be given in fall semester in 1912–13, elective to qualified sophomores.

10. Feeding and Management. — A continuation of Course 9, dealing in a similar manner with horses, sheep and swine. Prerequisite, Course 9. Seniors; 3 lectures a week. Credit, 3.
Associate Professor McLean.

11. Herd and Stud-book Study. — An advanced course of the study of the breeds of live stock, familiarizing the student with the most productive sires and dams of the various breeds, and the successful lines and methods of breeding. Prerequisites, Animal Husbandry 5 and 8. Seniors; 2 hours a week. Credit, 2.
Associate Professor McLean.

### DAIRYING.

Associate Professor Lockwood, Mr. Story.

*Elective Courses.*

1. Milk and its Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 5; 2 lecture hours and 1 laboratory period. Credit, 3.
Associate Professor Lockwood.

2. Buttermaking. — A study of hand and factory separators, separator instruction and cream separation; handling milk and cream for buttermaking on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof; practical mechanics as applied to the creamery. Prerequisite, Course 1; 2 laboratory periods and 1 lecture hour. Credit, 3. Associate Professor Lockwood.

3. Dairy Bacteriology. — A study of bacteriology relative to market milk and dairy work. Prerequisite, Courses 1 and 2; 2 laboratory periods and 1 lecture hour.
Associate Professor Lockwood.

4. Market Milk and Milk Products. — A study of market milk conditions, extent and development of the business; supply

and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection. The manufacture of milk products other than butter, including cheese; condensed milk; cottage cheese, casein, milk powder, ice cream, etc. Prerequisites, Courses 1, 2 and 3; 1 laboratory period and 2 lecture hours. Credit, 3. Associate Professor Lockwood.

5. Dairying. — A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work, principles of creaming, separators, elementary butter making, proper method of handling milk and cream, and the relation of market milk to the public health. One lecture, 1 two-hour laboratory period. Credit, 2.
Associate Professor Lockwood.

## FARM ADMINISTRATION.

Professor Foord.

### *Elective Courses.*

3. Farm Buildings and Machinery. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Agronomy 1, Animal Husbandry 2 and Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3. Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3. Professor Foord.

## POULTRY HUSBANDRY.

Associate Professor GRAHAM.

### *Elective Courses.*

1. ELEMENTS OF POULTRY CULTURE. — This course consists of a comprehensive study of poultry-house construction, poultry-house equipment, winter egg production, breeds and types of poultry. Two lectures. Credit, 2. Associate Professor GRAHAM.

2. ELEMENTS OF POULTRY CULTURE. — This is a continuation of Course 1, treating the subjects of incubation, brooding, care of growing stock, market poultry, including capons, roasters and broilers, and diseases of poultry. Two lectures. Credit, 2. Associate Professor GRAHAM.

3. POULTRY PRACTICE WORK. — This is a practical laboratory course in poultry carpentry, caponizing, killing and picking, dressing and packing poultry, also sorting and preparing eggs for market. Must be preceded by or accompanied by Course 1. One laboratory period. Credit, 1. Associate Professor GRAHAM.

4. INCUBATION AND BROODING. — In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg, and the care of sitting hens. This course must be preceded or accompanied by Course 2. One to 3 credits. Time to be arranged. Associate Professor GRAHAM.

5. PEN MANAGEMENT. — This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls, and profit and loss. Prerequisite, Course 1. One credit. Time to be arranged. Associate Professor GRAHAM.

6. POULTRY MANAGEMENT. — In this course a detailed study of large poultry farms and equipment, such as bone cutters, feed cutters, cramming machines, etc., will be carried on. It includes laying out and planning poultry buildings of all kinds, the mating of fowls and the preparing of birds for exhibition. Poultry diseases and investigation work carried on by experiment stations is prominent in this course. A few good poultry plants will be visited

by the class for practical demonstrations. Prerequisites, Courses 1, 2, 3 and 4. Two lectures, 1 laboratory period. Credit, 3.

Associate Professor GRAHAM.

7. ADVANCED POULTRY JUDGING. — This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text. Prerequisites, Courses 1, 2, 3, 4 and 5. One lecture and 2 laboratory periods. Credit, 3.

Associate Professor GRAHAM.

9. MARKET POULTRY AND POULTRY PRODUCTS. — This course includes the study of market classifications of poultry, eggs and feathers; the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept, showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course. Prerequisites, Courses 1, 2 and 3. One lecture or conference period and laboratory work. Laboratory periods to be arranged. Credit, 3.

Associate Professor GRAHAM.

## DIVISION OF HORTICULTURE.

Professor Waugh.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of horticulture.]

### *Required Courses (General).*

2. Nursery Practice. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Mr. Norman.

### *Elective Courses (General).*

3. Plant Materials. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3. Professor White.

4. Plant Materials. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3; 2 lecture periods and 1 laboratory period. Credit, 3. Professor White.

6. Plant Breeding. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 two-hour laboratory period. [Not given in 1912–13.] Credit, 3.

## FLORICULTURE.

Professor WHITE.

*Elective Courses.*

1. GREENHOUSE MANAGEMENT. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing concrete, bench construction, bulb culture, greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4.
Professor WHITE.

2. GREENHOUSE DESIGN AND CONSTRUCTION. — A continuation of Course 1, including also a study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisite, Floriculture 1; 7 hours. Credit, 4.
Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3.
Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Professor WHITE.

## FORESTRY.

Associate Professor Moon, Mr. Rane.

### *Elective Courses.*

1, 2. Dendrology and Silviculture. — These two subjects run parallel throughout the year. Under dendrology, the habits and needs of trees are studied, their distribution, soil and moisture requirements, growth, etc. Under silviculture are taken up the life history of trees and stands; tree characteristics, how modified; the concept of a forest and its subdivisions; methods of reproduction, both natural and artificial, with both theoretical and practical work in thinnings and nursery practice. Course 1 prerequisite to Course 2. Juniors; 3 lectures weekly, with 4 additional hours of optional field work. Credit, 3. Associate Professor Moon.

3, 4. Advanced Forestry. — Forestry 3 consists of an advanced course in forestry, in which forest economics, policy and law, forest mensuration, forest management and lumbering are taken up. Prerequisites, Forestry 1 and 2. Three lectures. Credit, 3.

Associate Professor Moon.

*5, *6. Silvics and Silviculture. — Courses consisting entirely in field work, running parallel with Forestry 3 and 4. Factors of site, silvical habits of trees, forest description and type mapping, reproduction, nursery practice, including the laying out of seed beds, forest mensuration and practical work in the various methods of making thinnings and reproduction cuttings. First given, 1912–13. Four hours. Credit, 2.

Associate Professor Moon.

## LANDSCAPE GARDENING.

Professor Waugh, Mr. Harrison.

### *Elective Courses.*

1. Elements of Landscape Gardening. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 6 hours a week. Credit, 3. Mr. Harrison.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1. Mr. Harrison.

3. General Design. — Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens and parks and private grounds; written reports of individual problems. Seniors; prerequisite, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 6 hours. Credit, 3. Professor Waugh.

4. General Design. — As stated under Course 3. Prerequisite, Course 3. Professor Waugh.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.
Professor Waugh.

6. Architecture. — The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing; 2 hours. Credit, 2. (Alternating with Course 10.)
Mr. Harrison.

7. Civic Art. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3.
Professor Waugh.

8. Civic Art. — As stated under Course 7. Prerequisite, Course 7. Professor Waugh.

10. Construction and Maintenance. — Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc. Two hours. Credit, 2. (Alternating with Course 6 and not to be given in 1912–13.) Mr. Harrison.

## MARKET GARDENING.

Assistant Professor Yeaw.

### *Elective Courses.*

2. Elements of Market Gardening. — A course designed for an introduction to market gardening as a business. The work consists primarily of actual field experience in handling vegetable crops from seed to maturity. This is supplemented with lectures and text-book, in which a study of methods, soils, fertilization, tillage and management is made. Juniors; 5 hours. Credit, 3. Assistant Professor Yeaw.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3. Assistant Professor Yeaw.

## POMOLOGY.

Professor Sears, Mr. Norman, Mr. Rees.

### *Elective Courses.*

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions;

special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3.
Professor SEARS.

4. COMMERCIAL POMOLOGY. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3.
Professor SEARS.

6. SPRAYING. — A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small fruit plantations. Prerequisites, Horticulture 2, Pomology 1 and 2. Seniors; 3 hours (1 lecture period and 1 laboratory period). Credit, 2.

Professor SEARS.

## DRAWING.

MR. HARRISON.

### *Elective Courses.*

1. FREEHAND DRAWING. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. Juniors; 6 hours. Credit, 3.
Mr. HARRISON.

2. MECHANICAL DRAWING. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. HARRISON.

## DIVISION OF SCIENCE.

Professor PAIGE.

### BOTANY.

Professor STONE, Assistant Professor OSMUN, Mr. MCLAUGHLIN.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

#### *Required Courses.*

2. HISTOLOGY, PHYSIOLOGY, MORPHOLOGY AND CLASSIFICATION OF PLANTS. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analysis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4. Assistant Professor OSMUN.

### *Elective Courses.*[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; 3 two-hour laboratory periods and 1 lecture hour. Credit, 4.
Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; 1 two-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; 1 two-hour laboratory and 1 one-hour lecture period. Credit, 2.
Professor STONE and Assistant Professor OSMUN.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; 3 three-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

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[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; 2 or 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4 or 5.
Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9. Professor STONE.

11. PLANT PHYSIOLOGY. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; 3 three-hour laboratory periods and 1 one-hour lecture period. Credit, 5.
Professor STONE and Mr. McLAUGHLIN.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11. Professor STONE and Mr. McLAUGHLIN.

13. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; 2 three-hour laboratory periods and 1 one-hour lecture period. Credit, 4.
Professor STONE.

14. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — As stated in Course 13. Prerequisite, Course 13. Professor STONE.

## GENERAL AND AGRICULTURAL CHEMISTRY.

Professor J. B. LINDSEY, Professor CHARLES WELLINGTON, Associate Professor JOSEPH S. CHAMBERLAIN, Assistant Professor CHARLES A. PETERS. Assistants, WILLIAM A. TURNER, HAROLD S. ADAMS.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and who intend following chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in the fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take graduate work leading especially to the degree of M.Sc., and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.[1]]

### *Required Courses.*

1. GENERAL CHEMISTRY. — *The Non-metals.* — An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements. Students presenting chemistry for entrance are given slightly different laboratory work. Kahlen-

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[1] Changes have been made in the numbering and names of certain courses heretofore given as shown in the following table:

| FORMER NUMBER AND NAME (CATALOGUE, 1910–11, WITH SUPPLEMENT). | NEW NUMBER AND NAME. |
|---|---|
| *Course 3.* — General chemistry. | *Course 3.* — Qualitative analysis. |
| *Courses 9 and 10.* — Quantitative analysis. | *Course 9.* — Quantitative analysis. Includes former 9 and 10. |
| *Courses 17 and 18.* — Chemical practice in agriculture. | *Courses 10 and 11.* — Agricultural chemical analysis. |
| Not given previously. | *Course 12.* — Special work in agricultural analysis. |
| Not given previously. | *Course 14.* — Special work in physiological and organic agricultural chemistry. |
| Not given previously. | *Course 15.* — Physical chemistry. |
| Not given previously. | *Course 16.* — Special work in physical chemistry. |
| Not given previously. | *Course 18.* — History of chemistry. |

berg's "Outlines of Chemistry" is used as a text. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Assistant Professor PETERS and Mr. ADAMS.

2. GENERAL CHEMISTRY. — *The Metals.* — A continuation of Course 1. A study of the common metals used in the arts. The laboratory work takes the synthetic form, and the student prepares fewer substances in larger quantities. Sulfur and arsenic insecticides and superphosphates are made in addition to preparations outlined in Blanchard's "Synthetic Inorganic Chemistry." Freshmen; lectures, 2 hours; laboratory, 2 hours. Prerequisite, Course 1. Credit, 3. Assistant Professor PETERS and Mr. ADAMS.

## *Elective Courses.*

3. QUALITATIVE ANALYSIS. — *Basic.* — A course in the systematic analysis of metallic salts. Many of the processes used in exact analysis are studied here. Special attention is given to the treatment of colloidal solutions and to the application of the law of mass action. Designed for *sophomores* and should be taken by all intending to study chemistry further. Text, Gooch and Browning's "Outlines of Qualitative Analysis," with Treadwell-Hall's "Qualitative Analysis" for reference. Prerequisite, Course 2. First offered in 1912–13. Lecture, 1 hour; laboratory, 4 hours. Credit, 3. Assistant Professor PETERS and Mr. TURNER.

4. QUALITATIVE ANALYSIS. — *Acidic.* — A continuation of Course 3. Assistant Professor PETERS and Mr. TURNER.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry

and agricultural analysis, and thus for future work in agricultural chemical investigation. Prerequisites, Courses 1, 2, 3 and 4. Juniors; those electing Course 5 are expected to elect Course 6. Lectures, 3 hours; laboratory, 4 hours. Credit, 5.
Associate Professor CHAMBERLAIN.

6. As stated under Course 5.
Associate Professor CHAMBERLAIN.

7. AGRICULTURAL CHEMISTRY. — This course and Course 8 are designed as an alternative for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but are planning to enter practical agricultural work and desire a further knowledge of chemistry as it is related directly to agriculture and agricultural problems. The work is planned in two parts, viz.: *Course 7, Inorganic Agricultural Chemistry,* the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the more important fungicides and insecticides, and the common materials of construction, such as tile, brick, cements, paints, oils, etc. *Course 8, Organic Agricultural Chemistry,* the study of the composition, physiological processes, uses and nutritive value of plants, and the composition and general processes of nutrition and growth of animals. Also, the study of products related to plants and animals, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspect of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8. Lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Associate Professor CHAMBERLAIN.

8. As stated under Course 7.
Associate Professor CHAMBERLAIN.

9. QUANTITATIVE ANALYSIS. — Instruction in this course includes the gravimetric and volumetric determinations of the commoner metals and non-metals in minerals, ores and industrial products. After closely following detailed methods of analysis, if time permits the student is directed in the discrimination between

various methods as to their accuracy and adaptability for special purposes. Talbot's "Quantitative Chemical Analysis" is used as a text. Prerequisite, Courses 1, 2, 3 and 4. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON and Mr. TURNER.

10. AGRICULTURAL CHEMICAL ANALYSIS. — In this course and Course 11 the methods previously studied, and other approved methods which appear from time to time, are applied to the examination of agricultural materials. The analysis of fertilizers, insecticides, fungicides and soils is followed by that of cattle foods, dairy products, sugars, starches and allied substances. Prerequisite, Course 9. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5. Professor WELLINGTON and Mr. TURNER.

11. AGRICULTURAL CHEMICAL ANALYSIS. — As stated under Course 10. Prerequisite, Course 10. Seniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON and Mr. TURNER.

13. PHYSIOLOGICAL CHEMISTRY. — This course is intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work, and who have had Courses 5 and 6, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 5 and 6 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment station work, especially those connected with investigations in animal nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Courses 7 and 8. Prerequisites, Courses 5 and 6 or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN.

[*12, *14, *16. GENERAL STATEMENT. — Each student electing either of these courses will be required to take up and follow out some special line of work, the object being to acquaint him with methods of original inquiry.

A single concrete example may be found in a comparative study of the different methods for the determination of the several forms of nitrogen. A thesis may not be required, but frequent consultation of the literature bearing on the subject will be necessary. These courses are valuable for all chemists, and particularly so for those intending to take up experiment station work. A student may choose any one but not two of these separate courses.]

*12. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS. — Topics for laboratory study will be assigned to each student. Prerequisite, Course 11. First offered in 1912–13. Seniors; laboratory, 10 hours. Credit, 5.

Professor WELLINGTON and Assistant.

*14. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY. — In this course, as in Courses 12 and 16, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, etc. Prerequisite, Course 13. First offered in 1912–13. Seniors; laboratory, 10 hours. Credit, 5.

Associate Professor CHAMBERLAIN.

*16. SPECIAL WORK IN PHYSICAL CHEMISTRY. — Special topics of agricultural importance assigned to each student. Prerequisite, Course 15. First offered in 1912–13. Seniors; laboratory, 10 hours. Credit, 5.

15. PHYSICAL CHEMISTRY. — A résumé of general chemistry from the viewpoint of modern physical chemistry. Prerequisites, Courses 1, 2, 3, 4, 9 and 10. First offered in 1912–13. Seniors; lectures, 2 hours; laboratory 2 hours. Credit, 3.

18. HISTORY OF CHEMISTRY. — This will consist of an exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at some length. More particular attention will be

given to the questions of plant and animal industry. Chemists are strongly advised to take this course. First offered in 1912–13. Seniors; lectures, 2 hours. Credit, 2.

Professor WELLINGTON.

## ENTOMOLOGY.

Professor FERNALD, Associate Professor CRAMPTON, Assistant Professor GATES, Mr. REGAN, ————.

### *Elective Courses.*

1. GENERAL AND ECONOMIC ENTOMOLOGY. — Course 1 comprises a general introduction to the study of insects, including studies on their structure as applied to their identification; the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collections, and methods for their control. The most important insecticides and their preparation and application are also treated. Juniors; 3 lecture periods. Students electing Course 1 must also take Course 2. Credit, 3.

Professor FERNALD.

2. GENERAL AND ECONOMIC ENTOMOLOGY. — A continuation of Course 1, with laboratory and field work on methods of collecting, preserving and studying insects and their work. Juniors; 2 laboratory or field periods. Credit, 3. Professor FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided, the time spent on the various subdivisions differing somewhat according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

*A. Morphology.* — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

*B. Histology.* — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

*C. Insecticides and Apparatus.* — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects; tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work.

*D. Coccidology.* — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

*E. Bibliography.* — Studies of the various entomological publications and of the methods of finding the literature on any insect.

*F. Special Studies.* — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; 1 one-hour lecture period and 3 two-hour laboratory or field periods. Credit, 4.

Professor FERNALD, Associate Professor CRAMPTON,
MR. REGAN and ——————

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

5. FOREST INSECTS. — A study of insects injurious to forest trees and of methods for their control, with laboratory and field work on these insects, and a study of what has been published about them. Seniors; prerequisites, Entomology 1 and 2. One lecture and 2 two-hour laboratory or field exercises. Credit, 3.

Professor FERNALD.

8. BEEKEEPING. — This course comprises a general consideration of the biology of the honey bee and of practical beekeeping. Some topics covered are: phylogeny, life history, general behavior and instincts, structure, products, relations of bees to plants and the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational or apicultural. Bee diseases, a thorough understanding of which is fundamental to the industry, are considered. So far as possible the work is made individual in constructing materials and apparatus.

Juniors; Seniors may elect. Courses 1 and 2 form a desirable preparation; 2 lectures; 1 two-hour laboratory period. Credit, 3.
Assistant Professor GATES.

*10. ADVANCED BEEKEEPING. — A course in advanced beekeeping will probably be offered in 1912–13.

## MATHEMATICS AND CIVIL ENGINEERING.

Professor OSTRANDER, Mr. DUNCAN, Mr. MACHMER, Mr. PARSONS.

### *Required Courses.*

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra." Freshmen; 3 hours a week. Credit, 3.
Mr. MACHMER and Mr. PARSONS.

2. HIGHER ALGEBRA. — As stated under Course 1.
Mr. MACHMER.

3. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours a week. Credit, 2.
Mr. DUNCAN.

4. PLANE TRIGONOMETRY (in Charge of Department of Physics). — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.
Professor HASBROUCK and Captain MARTIN.

### *Elective Courses.*

6.[1] PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.

Mr. DUNCAN and Mr. PARSONS.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2, 3 and 4; 3 hours a week. Credit, 3.

Professor OSTRANDER.

8.[1] DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 3, 4 and 7; 5 hours. Credit, 5.

Professor OSTRANDER.

10.[1] ADVANCED SURVEYING. — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. [Not given in 1912–13.] Text-book and lectures; 6 hours. Credit, 5. Professor OSTRANDER.

11. HYDRAULICS AND SANITARY ENGINEERING. — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. [Not given in 1912–13.] Text-book and lectures; 3 hours. Credit, 3.

Professor OSTRANDER.

12.[1] ELEMENTARY STRUCTURES. — An elementary course in roof and bridge stresses. Text-book and lectures; 4 hours. Not given in 1911–12. Credit, 3. Professor OSTRANDER.

13.[1] MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION. — Text-book and lectures; 5 hours. Not given in 1911–12. Credit, 5. Professor OSTRANDER.

15. APPLIED MECHANICS. — A course in applied mechanics, based on the calculus, with problems. Text-books and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Credit, 3.

Professor OSTRANDER.

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[1] Courses here numbered 6, 8, 10, 12, 13 and 14 were numbered 8, 10, 12, 13 and 17 respectively in the previous catalog.

14.[1] DESCRIPTIVE GEOMETRY. — An elementary course; given only in 1911–12; 5 hours. Credit, 3. Professor OSTRANDER.

## PHYSICS.

Professor HASBROUCK, Captain MARTIN, Mr. BUTMAN.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

### *Required Courses.*

1. GENERAL PHYSICS. — General physics covers mechanics of solids, mechanics of fluids, wave motion and heat. These topics are chosen for the required work because they are regarded as the most fundamental of all, and there is no part of the work in physics more necessary for the student who plans to take up practical farming. Course given by text-book and lectures. Sophomores; 4 hours' class-room work and 1 laboratory period. Credit, 5.
Professor HASBROUCK and Mr. BUTMAN.

### *Elective Courses.*

2. GENERAL PHYSICS. — Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.
Mr. BUTMAN.

3. OPTICAL INSTRUMENTS AND LIGHT. — Three-hour lecture course open to juniors and seniors; 3 hours. Credit, 3.
Mr. BUTMAN.

4. ELECTRICITY AND HEAT. — Three-hour lecture and laboratory course open to juniors and seniors; 3 hours. Credit, 3.
Mr. BUTMAN.

[Mathematics 4 (trigonometry) is, for convenience of grouping, listed under Mathematics, although in charge of the Department of Physics.]

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[1] Courses here numbered 6, 8, 10, 12, 13 and 14 were numbered 8, 10, 12, 13, 14 and 17 respectively in the previous catalog.

## VETERINARY SCIENCE.

Professor PAIGE, Assistant Professor GAGE.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

### *Elective Courses.*

1. INTRODUCTORY BACTERIOLOGY. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 two-hour laboratory exercises. Credit, 3. Professor PAIGE and Assistant Professor GAGE.

2. BACTERIOLOGY. — A continuation of Course 1, taking up more advanced problems.
Professor PAIGE and Assistant Professor GAGE.

3. VETERINARY SCIENCE. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor PAIGE.

4. VETERINARY SCIENCE. — As stated under Course 3.
Professor PAIGE.

## ZOÖLOGY AND GEOLOGY.

Assistant Professor GORDON, Mr. McLAINE.

### ZOÖLOGY.

### *Required Courses.*

1. ELEMENTARY ZOÖLOGY. — This course in a general way constitutes the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

### *Elective Courses.*

3. Invertebrate Zoölogy. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 4. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor Gordon.

4. Vertebrate Zoölogy. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; 2 two-hour laboratory periods and 1 lecture hour. Credit, 3.
Assistant Professor Gordon.

5. Animal Parasites. — A survey of this special field of zoölogy. Laboratory and lecture work, with outside reading. Laboratory technique. Seniors; not open to fewer than 3 students. Prerequisites, Courses 1, 3 and 4. Three two-hour periods, 2 one-hour periods. Credit, 5. Assistant Professor Gordon.

6. Animal Parasites. — A continuation of Course 5. Two two-hour periods, 1 one-hour period. Credit, 3.
Graduate Courses. — See "Graduate School."
Assistant Professor Gordon.

## GEOLOGY.

### *Elective Courses.*

2. General Geology. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 two-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor Gordon.

## DIVISION OF THE HUMANITIES.

Professor SPRAGUE.

### ECONOMICS AND SOCIOLOGY.

Professor SPRAGUE.

*Required Course.*

1. POLITICAL ECONOMY. — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system, the principles of production, exchange and consumption. This course will take up such topics as value, rentals, population, labor and its problems, capital, interest and profits, systems and factors of production, tariffs and commerce. Students will be called upon to analyze industrial plants in actual operation. Text-books, lectures and general discussions; a required course, but it may be taken in either junior or senior year; 3 hours. Credit, 3. Professor SPRAGUE.

*Elective Courses.*

2. INDUSTRIAL PROBLEMS. — A course in the most important industrial problems of the day, covering the methods of organizations of labor and capital, systems of industrial remuneration, means of securing industrial peace, legal status of labor unions and their activities, protective legislation for workmen and employers, the problems of immigration, the sweated industries, prison labor, child labor and industrial education. Text-book, with collateral readings, lectures and discussions; 3 hours. Credit, 3.
Professor SPRAGUE.

3. SOCIAL INSTITUTIONS AND SOCIAL PROBLEMS. — This course is devoted to the study of the social institutions, such as the family, the church, State and property; and to such current social problems as divorces, race suicide, crime and prison reform, poverty and its relief, social effects of low wages, child labor, overwork, immigration and congestion of population. The later weeks of the semester will be given to a short introduction to sociological theory. The correctional and charitable institutions of Massachusetts will be studied in considerable detail. Readings, lectures, papers; 3 hours. Credit, 3. Professor SPRAGUE.

4. Modern Social Reform Movements. — The history of property and its vital issues in modern times. The socialistic systems, anarchy and communism. Systems of workingmen's insurance in Europe and America, and other methods of relief from the chances of life. Educational reforms, in process, to meet the demands of a new age, and legislative remedies for the evils of social change and maladjustment. The crisis of Christianity under modern capitalized industrialism. These topics indicate the nature of the subjects studied. This course follows Economics 3. Three hours. Credit, 3. Professor Sprague.

5. Public Finance, Money and Banking. — This course follows Economics 1. It will take up taxation and the various systems for collecting public revenue in Europe and America, with the problems involved; the history of money and the systems of banking and finance now in operation; the causes and problems of economic crises and depressions; the currency problems of the United States. Readings, lectures and discussions; 3 hours. Credit, 3.
Professor Sprague.

6. Economic History. — This course will be divided between the economic history of Europe and that of America. An outline history will be followed with special study of selected epochal periods and important topics. Three hours. Credit, 3.
Professor Sprague.

8. Anthropology; the History of Human Civilization. — The evolutionary origin and history of man; characteristics of primitive men, departure from the animal status, and the beginnings of civilization; development of industries, arts and sciences; the growth of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern conditions, will constitute the subject matter of the course. Three hours. Credit, 3.
Professor Sprague.

## HISTORY AND GOVERNMENT.

Associate Professor Eyerly, Mr. Holcomb.

*Elective Courses.*

1. Elements of Political Science. — Nature and scope of political science; origin and evolution of the State; systems of government in the principal European States; organization and work-

ing of the national and of the State governments of the United States; relation of government to political parties and to public opinion; the functions of government as related to labor and commerce. Three hours. Credit, 3.

Associate Professor EYERLY.

2. LOCAL POLITICAL INSTITUTIONS. — A comparative study of the organization, functions and achievements of country and city groups, especially as these are concerned with such matters as taxation, finance, licenses, franchises, public ownership, highways, transportation and communication, water supply, fire protection, public lighting, markets, food inspection, garbage and sewage disposal, infectious diseases, housing conditions, police force, parks and playgrounds, libraries, schools, care of dependents. Three hours. Credit, 3. Associate Professor EYERLY.

3. THE HISTORY OF NEW ENGLAND. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3.

Mr. HOLCOMB.

5. THE HISTORY OF IDEALS. — This course treats history from the idealistic rather than from the economic, point of view. It attempts to define the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. Lectures and reading; 3 hours. Credit, 3. Mr. HOLCOMB.

## LANGUAGES AND LITERATURE.

Professor MILLS.

## LANGUAGES AND LITERATURE: ENGLISH, JOURNALISM AND PUBLIC SPEAKING.

Associate Professor NEAL, Assistant Professor LEWIS, Mr. WATTLES, Mr. WIDGER, Miss GOESSMANN.

### *Required Courses.*

1, 2. FRESHMAN ENGLISH. — Composition; introduction to literature. Recitations, laboratory practice and lectures; theme writing; conferences. Text-book and laboratory manual, Neal's "Thought Building in Composition." Freshmen; 4 hours. Credit, 4.

Associate Professor NEAL, Mr. WATTLES, Mr. WIDGER and Miss GOESSMANN.

3. SOPHOMORE ENGLISH.[1] — Composition; literature. Prerequisite, Course 2; sophomores; 2 hours. Credit, 2.

Assistant Professor LEWIS and Mr. WATTLES.

4. SOPHOMORE ENGLISH.[1] — As stated under Course 3. Prerequisite, Course 3. Mr. WATTLES and Miss GOESSMANN.

### *Elective Courses in English Language and Journalism.*

7. EXPOSITORY WRITING.[2] — The principles of exposition, with exercises in composition. Subjects will be largely found in current events and contemporary thought, and treated editorially. A foundation course in more advanced composition, primarily for juniors but open to seniors. [Not offered in 1912–13.] Two hours, with a third hour at the option of the instructor. Credit, 2. ——————————

8. EXPOSITORY WRITING.[2] — The principles of exposition with especial reference to technical writing, including the writing of bulletins; some attention also to the more popular exposition of scientific facts. Primarily for juniors but open to seniors. [Not offered in 1912–13.] Two hours, with a third hour at the option of the instructor. Credit, 2. ——————————

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[1] The rule that "students whose work in Courses 1, 2, and 3 reaches a standard satisfactory to the Department may be excused from not more than half of the sophomore work in English," has been repealed by faculty vote.

[2] These courses are to be substituted for the courses previously given under the same numbers as Composition Training Courses.

9, 10. Rural Journalism. — The courses in journalism aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant merely the application of journalistic principles in getting and suitably presenting material adapted to the non-urban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. Professional ideals are regarded as being practically involved in all parts of the work undertaken. Members of the classes have this year been supplying, under the head "The Bay State Ruralist," a feature page for the "Springfield Sunday Union." Members of all classes turn in copy regularly for publication or other disposition, as the instructor may determine, and must have free time for covering stories. Students wishing to proceed beyond elementary study are urged to consult with the instructor before making their election of subjects for the junior-senior years, in order that the most helpful program of work may be arranged.

9*A*. *Introduction to Journalism.* — The foundation conceptions and aims of journalism; practice in the simple forms of journalistic writing. Prerequisite to all other work in journalism, and valuable also to students preparing for practical farming, agricultural or general science, rural education, etc., as a vocation. [Heretofore given as 9*B*.] Two hours, with a third hour at option of the instructor. Credit, 2. Associate Professor Neal.

9*B*. *Journalistic Practice.* — The gathering and preparation of material for publication. The class may be organized as a staff. Prerequisite, 9*A* or its equivalent. [Heretofore given as 9*A*, Agricultural Journalism. Omitted in 1911–12.] Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor Neal.

9*C*. *Advanced Journalistic Practice.* — Informal; students will be assigned work as editorial assistants or writers, or otherwise employed in some form of journalistic activity. Study of particular forms of journalistic writing, of special subjects and their journalistic presentation, of particular kinds of periodical, or of

current topics, may be directed, and the presentation of a thesis may be required. Hours to be arranged. Two hours. Credit, 1.
Associate Professor Neal.

10*A*. *Reporting.* — News-gathering and news-writing. This includes the gathering and presentation of industrial and agricultural information, campus news or other stories, as may be directed. Courses 9*A* and 10*A* are the foundation courses in journalism. Students admitted to 10*A* who have not had 9*A* will be required to do extra work. Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor Neal.

10*B*. *Journalistic Practice.* — As stated under 9*B*.

10*C*. *Advanced Journalistic Practice.* — As stated under 9*C*.

17. ADVANCED COMPOSITION AND LITERATURE. — The reading and study of writings that are typical of literary style or form, especially in description and narration, and the writing of exercises involving problems of the same general cost as those illustrated by the readings. A good deal of fiction will probably be read, of which more or less will be found in the novels and short stories of our own day. On this study will be based the work in composition. Primarily for seniors but open to juniors. [Not given in 1911–12.] Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor Neal.

### *Elective Courses in Literature.*

9, 10. CULTURAL READING. — The substitution of other work for these courses is probable. Associate Professor Neal.

13. ENGLISH WRITERS AND THOUGHT. — Studies, laboratory problems, readings, and reports in some period of English literature. In 1911–12, Chaucer to the sixteenth century. Three hours. Credit, 3. Associate Professor Neal.

14. ENGLISH WRITERS AND THOUGHT. — As in Course 13. In 1911–12, the sixteenth century to Shakspere. Three hours. Credit, 3. Associate Professor Neal.

15. ENGLISH LANGUAGE AND LITERATURE. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Three hours. Credit, 3. Assistant Professor Lewis.

16. English Language and Literature. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Three hours. Credit, 3. Assistant Professor Lewis.

18. Advanced Literature. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types; in 1911–12, Tennyson. Three hours. Credit, 3. Associate Professor Neal.

### *Required Courses (Public Speaking).*

1. Freshman Public Speaking. — Freshman public speaking is required in either the first or the second semester, at the option of the instructor. Voice exercises; practice in the delivery of declamations and interpretive readings. Freshmen; 1 hour. Credit, 1.
Mr. Widger.

2. Freshman Public Speaking. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1.
Mr. Widger.

### *Elective Courses.*

*8. Oratory.[1]— Speeches on assigned topics; prescribed reading; the preparation and delivery of an oration, supplemented by a study of the principles of oratorical composition and delivery. It is especially recommended for those who desire to enter the Flint contest. Prerequisite, Course 3; 1 hour. Credit, 1.
Mr. Widger.

9. Debating. — Considerable time is given to the study of argumentation and brief-drawing. The class is divided into teams for the platform discussion of leading questions of the day. This course is designed to develop readiness in extempore speaking. It is recommended for those who desire to enter the intercollegiate debates. Prerequisite, Course 3; 2 hours. Credit, 2.
Mr. Widger.

10. Dramatic Reading.[1]— Exercises for voice and gesture; a study of the elements of vocal expression and action; expressional reading of selections in prose and poetry; presentation of scenes from plays. Prerequisite, Course 3; 1 hour. Credit, 1.
Mr. Widger.

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[1] It is expected that Courses 8 and 10 will be combined into a 2-hour course as Occasional Oratory.

## LANGUAGES AND LITERATURE: GERMAN.

Assistant Professor Ashley, Mr. Julian.

### *Required Courses.*

1. Elementary German. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. Julian.

2. Elementary German. — As stated under Course 1. Prerequisite, Course 1. Mr. Julian.

3. Intermediate German. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Assistant Professor Ashley.

3A. Intermediate German. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. Julian.

4. Intermediate German. — As stated under Course 3. Prerequisite, Course 3. Assistant Professor Ashley.

4A. Intermediate German. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3. Mr. Julian.

5. Advanced German. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Conducted in German. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Assistant Professor Ashley.

*Elective Courses.*

6. Advanced German. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Assistant Professor Ashley.

7. Modern German. — Reading of articles from the best modern German periodicals, such as "Ueber Land und Meer;" conversation and composition work based on text. "Ferien in Deutschland," prepared by instructor; 3 hours. Credit, 3.
Assistant Professor Ashley.

8. Modern German. — As stated under Course 7.
Assistant Professor Ashley.

9. Scientific German. — Reading of modern magazine articles and works in German of a scientific nature. Different work assigned according to needs of individual students. Open to juniors who have completed Course 4A or more advanced work. Three hours. Credit, 3. Assistant Professor Ashley.

10. Scientific German. — As stated under Course 9.
Assistant Professor Ashley.

11. German Literature. — Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust," and one modern typical drama. Prerequisite, Course 6 or 10.
Assistant Professor Ashley.

12. German Literature. — As stated under Course 11.
Assistant Professor Ashley.

## LANGUAGES AND LITERATURE: FRENCH.

Assistant Professor Mackimmie, Mr. Harmount.

*Required Courses.*

1. Elementary French. — A beginning course. Thieme and Effinger's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4.
Mr. Harmount.

2. Elementary French. — As stated under Course 1. Prerequisite, Course 1. Mr. Harmount.

3. Intermediate French (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
Assistant Professor Mackimmie, Mr. Harmount.

4. Intermediate French. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Assistant Professor Mackimmie.

5. Advanced French (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

### *Elective Courses.*

6. Advanced French (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatists will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor Mackimmie.

7, 8. Scientific French. — This course is intended to continue and enlarge the scientific readings begun in the freshman and sophomore years. It will consist of the reading of a scientific reader, outside readings and reports, and the careful reading of some recent work or series of articles in the subject in which the student is taking his major. Prerequisite, the required French or its equivalent. Intended principally for juniors. Three hours. Credit, 3. Mr. Harmount.

9, 10. French Literature from 1852. — The outline is intended as a suggestion. The exact subject-matter of the course will be determined when the men are enrolled. The object of this course is to give an introduction to the movements of French literature in the past fifty years. In the drama readings from Augier, A. Dumas, fils, Delavigne; in the novel from Flaubert, the de Goncourts, Zola; in criticism from Taine, Renan and Sainte Beuve; for the literary history of the period Lanson's Histoire de la litterature française. Prerequisite, the required French. Juniors or seniors; 3 hours. Credit, 3.

Assistant Professor MACKIMMIE.

## LANGUAGES AND LITERATURE: SPANISH.

Assistant Professor MACKIMMIE.

### *Elective Courses.*

1. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor MACKIMMIE.

2. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.

Assistant Professor MACKIMMIE.

## LANGUAGES AND LITERATURE: MUSIC.

Assistant Professor ASHLEY.

### *Elective Courses.*

1. HISTORY AND INTERPRETATION OF MUSIC. — History of music among the ancients; medieval religious and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1.

Assistant Professor ASHLEY.

2. HISTORY AND INTERPRETATION OF MUSIC. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1.

Assistant Professor ASHLEY.

## DIVISION OF RURAL SOCIAL SCIENCE.

PRESIDENT BUTTERFIELD.

### AGRICULTURAL ECONOMICS.

Assistant Professor CANCE.

*Required Courses.*

2. AGRICULTURAL INDUSTRY AND RESOURCES. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Assistant Professor CANCE.

*Elective Courses.*

4. ELEMENTS OF AGRICULTURAL ECONOMICS. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; determination of price; speculation; problems of land tenure and land values; taxation of land values; farmers' organizations; the farmer and legislation; the maintenance of the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Assistant Professor CANCE.

5. HISTORICAL AND COMPARATIVE AGRICULTURE. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to effect agri-

cultural changes. Lectures, readings and library work. Seniors and juniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3.
Assistant Professor CANCE.

[6. CO-OPERATION IN AGRICULTURE. — The course contemplates a somewhat comprehensive view of the history, principles and business relations of agricultural organization for profit. (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, as illustrated by the most advanced and prosperous business organizations and exchanges, with particular reference to the marketing of perishable products. Lectures, text, assigned reading and practical exercises; 2 hours. [Not given in 1912–13.] Credit, 2. Assistant Professor CANCE.]

7. PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems, — land tenure; size of farms; causes affecting land values; private property in land; taxation of farm values; special problems, — cost of producing farm products; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors and juniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 or 3 hours a week. Credit, 2 or 3. Assistant Professor CANCE.

8. THE AGRICULTURAL MARKET. — This course contemplates a fundamental study of the forces and conditions which determine the prices of farm products, and the mechanism, methods and problems concerned with transporting, storing and distributing them. Such topics as supply and demand, course of prices, transportation by freight, express and trolley, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market, direct sales and the like will be taken up. The

characteristics and possibilities of the New England market will be given special attention. Lectures, readings, assigned studies and field work. [Not offered in 1913–14.] Juniors and seniors; 2 or 3 hours a week. Credit, 2 or 3. Assistant Professor CANCE.

9. SEMINAR. — Research in agricultural economics and history: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1. Assistant Professor CANCE.

10. SEMINAR. — As stated in Course 9.
Assistant Professor CANCE.

## AGRICULTURAL EDUCATION.

**Professor HART, Associate Professor MORTON.**

### *Elective Courses.*

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. RURAL SCHOOL PROBLEMS. — A study of mental growth; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2. Professor HART.

4. RURAL SCHOOL PROBLEMS. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical

sciences as are adapted to the work of the public schools; planning, and practical work in school gardens; decoration of school grounds; equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3.
Professor HART, Associate Professor MORTON.

5. SEMINAR IN EDUCATION. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: rural school supervision, and rural school surveys, etc. Seniors and graduate students; 2 hours. Credit, 2. Professor HART.

6. SEMINAR IN EDUCATION. — As stated under Course 5.
Professor HART.

## RURAL SOCIOLOGY.

Associate Professor EYERLY, President BUTTERFIELD, Professor HART, Mr. HOLCOMB.

### *Elective Courses.*

2. THE RURAL COMMUNITY. — A broad survey of the field of rural sociology, including such topics as the movements of the rural population, the social conditions and life of rural people, the influence of rural life, the description of the various social institutions of the rural community, an analysis of the fundamental problems of rural life, and the means of developing and redirecting the life of the rural community. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President BUTTERFIELD and Associate Professor EYERLY.

3. THE LITERATURE OF RURAL LIFE. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities; 3 hours. Credit, 3.
Mr. HOLCOMB.

4. RURAL LAW. — The work of this course will cover such points as land titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures, and class discussions; 1 hour. Credit, 1. Professor HART.

5. THE SOCIAL CONDITIONS OF THE RURAL PEOPLE. — Composition of the rural population; vital statistics; nature, extent and causes of diseases and accidents; health agencies of control; extent and causes of delinquency and dependency; conditions of temperance, of sexual morality and family integrity; child labor; woman's work and position; relation of employer to employee; standard of living; size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics; 3 hours. Credit, 3. Associate Professor EYERLY.

6. SOCIOLOGICAL ASPECTS OF CO-OPERATION AMONG FARMERS. — An historical sketch of the origin, extent and success of co-operation among farmers in the various European countries and in the United States; personal qualities and social conditions necessary to successful co-operative endeavor; the various forms of co-operative organization viewed in their industrial, intellectual and moral aspects; the influence of co-operation on the farmer's individualism, conservatism, self-help, thrift, contentment and on agrarian legislation, scientific agriculture and farm labor; the relation of co-operation to neighborhood life, to community pride and loyalty, to further associated effort, to class stability, solidarity and status; the demand of co-operation for a new type of leadership; the relation of co-operation to socialism and the competitive system; 3 hours. Credit, 3. [Given in 1912–13; not given in 1913–14.]

Associate Professor EYERLY.

7. RURAL INSTITUTIONS. — A study of the organized agencies by which rural communities carry on their various forms of associated life; particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment. Special attention given to the rural family and the rural church; 3 hours. Credit, 3.

Associate Professor EYERLY.

8. THE STATE AND THE FARMER. — A general survey of political organizations and movements among farmers in foreign countries and their influence in shaping agrarian legislation; the character, extent and results of foreign State aid to the farming class; political movements among farmers in the United States; "Granger" legislation; relation of the Department of Agriculture, State boards of agriculture, agricultural colleges and experiment stations, postal

system, railway commissions, highway commissions, public health agencies, etc., to rural welfare; 3 hours. Credit, 3.

Associate Professor EYERLY.

9. THE SOCIAL PSYCHOLOGY OF RURAL LIFE. — Characteristics of the rural mind; character of hereditary and environmental influences; nature and effects of face to face groups; psychological effects of isolation, relative security and freedom from strain; relation of contact with nature, of control over immediate environment, of family co-operation and of neighborhood life to self-control, self-expression, sympathy, service and leadership; nature and effects of fashion, conventionality and custom; character of discussion and public opinion, and their relation to class feeling and organization; relation of individualism, conservatism and homogeneity to crowd phenomena and progressive democracy; 3 hours. Credit, 3. Associate Professor EYERLY.

10. FARMERS' ORGANIZATIONS. — The history, purposes and achievements of the grange, the farmers' union, farmers' clubs, village improvement associations, boys' clubs, etc.; the nature, scope, methods and history of local, State and national associations formed about some farm product or special farm interest, *e.g.,* dairying, horticulture, stock breeding, forestry; their influence on "better farming, better business, better living;" their influence in forming a class consciousness and in shaping legislation; need of federation; 3 hours. Credit, 3. Associate Professor EYERLY.

11. SOCIOLOGICAL ASPECTS OF CURRENT AGRICULTURAL QUESTIONS. — Government conservation policy, roads, railways, trolleys, telephones, postal service, credit facilities, taxation, pure food laws, tenancy and ownership, intensive versus extensive farming, agricultural labor; 3 hours. Credit, 3.

Associate Professor EYERLY.

13. SEMINAR.

Associate Professor EYERLY.

## GENERAL DEPARTMENTS.

### MILITARY SCIENCE AND TACTICS.

Captain MARTIN, Mr. PARSONS.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

### *Required Courses.*

1. Freshman Drill. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

2. Freshman Drill. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

3. Sophomore Drill. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin, Mr. Parsons.

4. Sophomore Drill. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

5. Sophomore Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1. Captain Martin.

6. Sophomore Tactics. — As stated under Course 5. Sophomores; 1 hour. Credit, 1. Captain Martin.

7. Junior Drill. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

8. Junior Drill. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1.
Captain Martin.

9. Junior Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports, returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1.
Captain Martin.

10. Junior Tactics. — As stated under Course 9. Juniors; 1 hour. Credit, 1.
Captain Martin.

*Elective Courses.*

11. Senior Drill. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin.

12. Senior Drill. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1.
Captain Martin.

## PHYSICAL EDUCATION AND HYGIENE.

Assistant Professor Hicks.

### Hygiene.

*Required Courses.*

1. Hygiene. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1.
Assistant Professor Hicks.

### Physical Education.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]

## *Required Courses.*

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit (given only for Course 2), 1.
Assistant Professor HICKS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1.
Assistant Professor HICKS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit (given only for Course 2), 1.
Assistant Professor HICKS.

4. GRADED GYMNASTICS. — As stated under Course 3.
Assistant Professor HICKS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit (given only for Course 2), 1.
Assistant Professor HICKS.

6. HEAVY GYMNASTICS. — As stated under Course 5.
Assistant Professor HICKS.

## *Elective Courses.*

7. TRAINING COURSE. — Leadership class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1.
Assistant Professor REYNOLDS.

8. TRAINING COURSE. — As stated under Course 7.
Assistant Professor REYNOLDS.

# THE GRADUATE SCHOOL.

# THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

HENRY T. FERNALD, Ph.D., Acting Director of the Graduate School and Professor of Entomology.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

## ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

### Nature and Methods of Graduate Work.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to. give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

## THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

Two copies of each thesis in its final form, ready for the printer, must be submitted to the director of the school before the candidate for the degree may take the required oral examination. One of the said copies, to contain all drawings, is to be retained as an official copy by the said director, and the other by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis. When printed, three copies of each thesis must be deposited with the director of the graduate school and three copies with the department in which the work was carried out.

All theses become the property of the department in which they are prepared.

## FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

## DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

### COURSES FOR DEGREE OF MASTER OF SCIENCE.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.

Available as a minor subject for the degree of master of science: —

Zoölogy.

### COURSES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zoölogy.

## GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

### (*a*) *Major Courses.*

BOTANY. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The department of chemistry is prepared to offer advanced courses in the following subjects: —

(*a*) Inorganic chemistry.
(*b*) General organic chemistry.
(*c*) Physiological chemistry.
(*d*) Qualitative and quantitative analysis.
(*e*) Analyses of fertilizers, cattle feeds, dairy products, soils, insecticides, sugars, and of any other materials of an agricultural nature.

Instruction may also be obtained in special problems relating to the chemistry of soils, plants and animals. Students are taught how to conduct original investigations. Further information may be secured by consulting the chemical staff of the department.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogeny; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

It is probable that the work in horticultural subjects will soon be considerably developed and modified.

### (*b*) *Minor Courses.*

ZOÖLOGY. — Courses in zoölogy are available as a minor for the degrees of master of science and doctor of philosophy. The nature of the work varies according to circumstances, and may be intensive in a special field, or of a somewhat more general character; depending on the student's previous acquaintance with general zoölogical science.

The time devoted to zoölogy as a minor for either of the above-named degrees may vary from twelve to sixteen hours per week, pursued for a year and a half.

# THE SHORT COURSES

AND

# THE EXTENSION SERVICE.

# THE SHORT COURSES AND THE EXTENSION SERVICE.

Under the usual definition of extension activities, Short Courses are not strictly extension work. They are rather a part of the academic work of the institution. For the sake of administrative efficiency it has seemed best to place them in charge of the Director of the Extension Service, in so far as organization and direction are necessary. An effort is made through these courses to bring to the college, for a few weeks or a few days, as many people as can possibly be reached in this way. In the main, the instruction in the Short Courses is given by the regular teaching force of the college, the same laboratories and equipment being used for this work as in the regular college work.

The Extension Service proper comprises various methods for the dissemination of agricultural information to the people of the Commonwealth who are interested in agriculture and country life, but who cannot come to the college for even a short time. The object of the Extension Service is to make the college as useful to the people of the Commonwealth as is possible.

## A. THE SHORT COURSES.

### ORGANIZATION AND DESCRIPTION.

The work is organized thus: —

Short Courses given at the College.
1. Winter School.
    - (*a*) Ten Weeks' Winter Course.
    - (*b*) Poultry Course.
    - (*c*) Farmers' Week.
    - (*d*) Beekeepers' Course.
    - (*e*) Packing School.
2. Summer School.
    - (*a*) The Summer School (General Course).[1]
    - (*b*) Conference for Rural Leaders.

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[1] Omitted in 1912.

ENROLLMENT, 1910–11.

| | |
|---|---|
| Ten Weeks' Winter Course, | 113 |
| Special Poultry Course, | 74 |
| Farmers' Week, | 830 |
| Beekeepers' Course, | 16 |
| Summer School, | 153 |
| Conference of Rural Social Workers, | 247 |
| Total, | 1,433 |

*Short Courses at the College (Winter School; Summer School).*

EXPENSES IN THE SHORT COURSES. — The expenses of attending either of the short courses will be about as follows: —

| | |
|---|---|
| Registration fee, | $5 |
| Furnished rooms with private families, per week, | $1–$3 |
| Board at college dining hall, per week, | $4 |
| Board with private families, per week, | $4–$5 |

Students in either of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work; the cost in Amherst is about $1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic before entering. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women. Students must be at least eighteen years of age, and must furnish satisfactory evidence of good moral character.

Application for admission should be made as early as possible. Students should report to the professor in charge on Monday, Jan. 6, 1913, in order to begin work promptly on the morning of Jan. 7, 1913.

COURSES IN THE TEN WEEKS' WINTER SCHOOL (JAN. 2 TO MARCH 8, 1912). — The following courses were given: —

1. Soil Fertility. Director HURD and Assistant Director WAID. Three exercises a week for ten weeks.
2. Field Crops. Assistant Professor HASKELL. Three exercises each week for ten weeks.
3. Breeds and Breeding. Associate Professor MCLEAN and Mr. QUAIFE. Three exercises weekly, with appointed hours for stock judging.
4. Feeding and Management. Associate Professor MCLEAN and Mr. QUAIFE. Two exercises weekly.

5. Dairying. Associate Professor LOCKWOOD, Mr. STORY and assistants. Three one-hour and two two-hour periods.
6. Dairy Bacteriology. Associate Professor LOCKWOOD. Two exercises each week.
7. Animal Diseases and Stable Sanitation. Dr. PAIGE. Two exercises each week.
8. Poultry Course. Associate Professor GRAHAM. Lectures with one or two demonstration periods per week.
9. Fruit Growing. Professor SEARS. Five exercises each week for ten weeks.
10. Market Gardening. Assistant Professor YEAW. Three lectures and one afternoon practicum each week for ten weeks.
11. Landscape Gardening. Professor WAUGH and Mr. HARRISON. Twenty exercises.
12. Floriculture. Professor WHITE. Five exercises each week.
13. Forestry. Associate Professor MCON. One lecture a week for ten weeks.
14. Botany. Assistant Professor OSMUN and Mr. MCLAUGHLIN. Three exercises each week.
15. Entomology. Professor FERNALD and assistants. Three exercises each week.
16. The Development of the Community. Two periods a week for ten weeks.
17. Farm Buildings and Machinery. Professor FOORD. One exercise a week for ten weeks.
18. Farm Accounts. Professor FOORD. One exercise each week.
19. Mechanics. Professor LOCKWOOD and Mr. WALLACE. One exercise of two hours each week.
20. Meat, Meat Production and Marketing on the Farm. Mr. HINKLEY, of Armour & Co.
21. Rural Sanitary Science. Assistant Professor GAGE. Two one-hour exercises per week.

THE ONE WEEK POULTRY COURSE (WINTER SCHOOL, MARCH 4 TO 8, 1912). — In order to give a large number of poultry men, who cannot come to the college for a longer time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, marketing poultry products, etc., a convention was held on the dates given above. The week was filled with practical talks and demonstrations. Some of the leading professional and practical men in this country were engaged to supplement the work of the regular faculty. No charges aside from cost of room and board were made for this course.

FARMERS' WEEK (WINTER SCHOOL, MARCH 11 TO 15, 1912). — In order to reach those who cannot come to the college for a longer time, this very practical course, four days in length, is given. The regular college equipment is used, and the work of the regular faculty will be supplemented by lectures and demonstrations given by eminent men.

The work is divided into three sections: (1) General agriculture, to include farm management, farm crops, dairying, animal breeding and feeding, veterinary science and bacteriology; (2) Horticulture, to include fruit growing, market gardening, floriculture and forestry; (3) Farmers' wives' section, including lectures and demonstrations in home economics, cookery and problems of home making.

Features of the week will be the evening lectures by specialists along agricultural lines, the conference pertaining to problems of rural betterment aside from practical agricultural topics, a corn and grain show, and others.

The Massachusetts Dairymen's Association, M. A. C. Agricultural Improvement Association and other organizations hold their annual meetings at the college this week.

BEEKEEPERS' COURSE (WINTER SCHOOL, MAY 29 TO JUNE 12, 1912). — The college has recently come into possession of a number of swarms of bees which, with the other equipment to be added, will afford a fine opportunity for those interested to get some practical information on this subject. The course will be under the direction of Dr. Burton N. Gates. The following courses will be given: —

1. Practical Phases of Beekeeping. Assistant Prof. BURTON N. GATES.
2. Crops for Honey Bees. Dr. WILLIAM P. BROOKS.
3. Relation of Bees to the Pollination of Plants. Prof. GEORGE E. STONE.
4. Origin and Evolution of the Honey Bee. Prof. HENRY T. FERNALD.
5. Bees and Beekeepers' Supplies. Dr. JAMES B. PAIGE.

PACKING SCHOOL (WINTER SCHOOL, FEB. 12 TO 24, 1912). — The greatest need in New England fruit growing is acknowledged to be proper grading and packing of the fine fruit that is already being grown. To give all who desire it the best of instruction in this subject, a two weeks' course in packing was arranged between the dates given above. The work consisted of grading and packing apples in boxes and barrels. Special lectures and demonstrations were arranged for those who attended, on the subjects of planting, fertilizing, pruning, spraying and the management of orchards.

THE SUMMER SCHOOL (GENERAL COURSE). — The very successful summer school of agriculture and country life which has been held by the college for the last five years will be omitted in 1912. In 1913 it will be resumed, with the addition of new courses, more instructors and covering a broader scope of work.

A bulletin giving the courses, instructors and other information will be issued in March, 1913.

CONFERENCE FOR RURAL LEADERS (SUMMER SCHOOL, JUNE 28 TO JULY 3, 1912). — The Conference for Rural Leaders which has been held as a closing feature of the summer school will take place as usual, except at an earlier date (June 28 to July 3 inclusive).

The Federation of Churches of Massachusetts, the State Library Commission, Massachusetts Civic League, the New England Home Economics Association, the County Work of the Y. M. C. A. and the State Board of Education have each decided to co-operate with the college by furnishing teachers and lecturers for their respective sections. The State Grange and the State Board of Health have been asked to co-operate in a similar manner.

Definite class instruction will be given each morning. The afternoons will be given up entirely to special and general conferences, demonstrations of organized play, recreation, etc. The evenings will be given over to music and lectures by the most eminent men, who are making a study of rural sociology, economics and education.

The Rural Social Service exhibits will be more elaborate and extensive than in 1911.

The object of this conference is to acquaint those who are leaders in their respective communities with the work that is going on, not only in Massachusetts but in New England and other parts of the world, and to give them renewed inspiration and enthusiasm for larger and more intelligent efforts.

Teachers, clergymen, grange officers, librarians, county Y. M. C. A. workers, town officers, boards of health, officers of village improvement societies, home makers, school officers, and all others interested in community development, are cordially invited to attend this conference. The expenses for board and room are low. There are no tuition or registration fees.

A complete program will be published next May and can be had by making application for it.

## B. THE EXTENSION SERVICE.

### ORGANIZATION AND DESCRIPTION.

1. Special Days for Foreigners; Agricultural Organizations, etc.; Polish Farmers' Day.
2. Instruction given away from the College.
    1. Correspondence Courses.
    2. Lecture Courses and Demonstrations.

3. Conferences for Community Development.
4. Extension Schools of Agriculture.
5. Educational Trains (Steam and Trolley).
6. Educational Exhibits, with Lectures and Demonstrations at Fairs.
7. Demonstration Orchards.
8. Dairy Improvement Associations.
9. The M. A. C. Agricultural Improvement Association.
10. Agricultural Surveys.
11. Advisory Work with Individuals, State Institutions, etc.
12. Publications, "Facts for Farmers," etc.
13. Student Extension Work.
14. Faunce Demonstration Work.
15. Boys and Girls' Clubs.
16. Demonstration Plots.
17. Traveling Libraries.
18. Co-operation with Various Organizations already in Existence.
19. District Field Agents.
20. Information by Correspondence, etc.

### 1. *Special Days for Foreigners, Associations, etc.*

Days are set aside for especial attention to the interests of foreigners, of agricultural organizations, etc.

Agricultural Organizations. — It has been especially pleasing to the college to have organizations such as the Massachusetts Poultry Association, the Massachusetts Fruit Growers' Association, Market Gardeners' and Breeders' Associations, and others of a similar nature meet frequently at the college. Usually, a program of one or two days is provided, largely by the college faculty. These meetings serve the twofold purpose of giving the members of these organizations a chance to inspect the equipment and see the work that is being carried on by the college, and it also gives the college men a chance to find out the needs of the men engaged in the various lines of agriculture. It is to be hoped that organizations like those named above and others will continue to meet at the college even more frequently than in the past.

Polish Farmers' Day. — In order to show the Polish farmer — who forms a large part of the population of this section of the Connecticut valley — what the college has to offer him, a Polish Farmers' Day was held in 1911. This was such a success that a like day was held March 28, 1912. Members of the faculty gave lectures which were interpreted by Mr. Wolski of Holyoke; some of the Polish farmers who have made a success of farming also gave talks. The Y. M. C. A. co-operates with the college in this work, and Dr. Tupper of the Immigration Department and Mr. Rudman, county secretary for Franklin County, addressed the gathering.

Mr. John Romaszkiewisc, president of the Polish American Alliance, also gave an address.

### 2. *Instruction given away from the College.*

An abstract follows of the instruction that is given away from the college. The abstract divides this instruction into correspondence courses and instruction not included in the correspondence course.

Correspondence Courses. — The correspondence courses are offered by the Massachusetts Agricultural College in response to calls from all sections of the State, from people who desire agricultural information but who, for various reasons, cannot come to the college for it. These courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists and teachers, either in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice have changed and are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added later.

Method of Conducting Correspondence Work. — While a large number of books have been written on various agricultural subjects, very few of them are especially adapted to the correspondence course work. For this reason our courses are conducted principally by especially prepared lessons. The subject-matter of these lessons partakes somewhat of the lectures that are given to the college classes. Whenever possible we recommend one or two books which ought to be purchased and read along with the course. Other books are recommended for collateral reading, which oftentimes can be obtained from the local libraries.

The courses are especially recommended to Y. M. C. A.'s, granges and other farmers' clubs for study. It is to be hoped that grange lecturers, club secretaries or some other interested person will organize study classes. If the size of the class, or the interest which the members take in the subject, is sufficient, we shall be pleased to send a representative of the college to the class from time to time to discuss the work and offer suggestions. A description of the correspondence courses follows: —

1. Soil and Soil Improvement. Director W. D. Hurd. The cost of the course is $1.

2. Manures and Fertilizers. Director W. D. HURD. The cost of the course is $1.
3. Field Crops. Assistant Prof. SIDNEY B. HASKELL. The cost of the course is $1.
4. Farm Dairying. Prof. W. P. B. LOCKWOOD. The cost of the course is $1.
5. Fruit Growing. Prof. F. C. SEARS and Mr. A. J. NORMAN. The cost of the course is $1.
6. Market Gardening. Assistant Prof. F. L. YEAW. The cost of the course, including the textbook, is $2.50.
7. Animal Feeding. Mr. G. F. STORY. The cost of the course is $1.
8. Floriculture. Prof. E. A. WHITE. Part I. The general culture of plants, including those grown out of doors as well as those grown under glass. Part II. Greenhouse construction and heating. Part III. Carnation culture. Part IV. Rose culture. The cost of each part, not including the textbook, is $1.
9. Farm Accounts. Prof. J. A. FOORD. The cost of the course is $1.
10. Agriculture in the Common Schools. Assistant Prof. F. B. JENKS. The cost of the course is $1.
11. Agricultural Education. Prof. W. R. HART. The cost of the course is $1.
12. Beekeeping. Assistant Prof. B. N. GATES. The cost of the course is $1.
13. Forestry. Associate Prof. F. F. MOON. The cost of the course is $1.
14. Shade Tree Management. Prof. G. E. STONE. The cost of the course is $1.
15. Entomology. Prof. H. T. FERNALD. The cost of the course is $1.
16. Poultry. Associate Prof. J. C. GRAHAM. The cost of the course is $1.

*Enrollment for Correspondence Courses.* — Students may enroll in the correspondence courses any time between September 1 of each year and the following 1st of June. It has been found advisable not to run the courses during the summer, because the farmers as well as the other students are so busy that they cannot spend the necessary amount of time upon the lessons during the summer months. We are better equipped than we were last year to handle the great number of students who desire these courses, and we hope to be able to handle all the students who enroll; nevertheless, it will be well to enroll early so as to be sure of getting in before the enrollment closes.

Enrollment must be made on the card which is furnished by the college. This will entitle the student to a suitable set of covers for the courses, and other privileges.

*Expenses of the Correspondence Courses.* — In order that none may enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of $1 for each course, except in Course 8, where it is necessary to charge $1 for each of the four parts, as each part is really a course in itself. This fee is payable strictly in advance, when the enrollment card is sent. The first lesson of the course will not be sent until the enrollment fee is paid.

This fee is not charged to cover cost of preparing the course, for this, in time of the instructors, is many times what is received, but it is used to defray the expenses of postage and materials which are used in preparation of the lessons, and to insure a higher quality of work from those who enroll.

The cost of the text-book, when one is used, is in addition to this enrollment fee. We strongly urge all students to purchase one or two books to be used in connection with each course, because they can be kept and used for reference purposes after the course is completed. We have made arrangements with the Johnson Book Company, Amherst, Mass., to handle all of these books at reduced rates.

For a catalogue of books and prices address the Johnson Book Company, Amherst, Mass.

Remittances should be made by money order or check.

LECTURE AND DEMONSTRATION COURSES AWAY FROM THE COLLEGE. — The renewed and unprecedented interest in agriculture and rural life makes many more calls on the college for lectures and demonstrations than can be met. These calls come from all sorts of organizations, and the audiences are usually of good size and comprised of interested people, who are eager to get the latest scientific information to use in their work.

CONFERENCES ON COMMUNITY BETTERMENT. — Largely as an outgrowth of inspiration received in our Summer School and Conference, meetings have been held in West Newbury, Sandwich, Walpole, Rowe and Kingston, where subjects of community betterment were discussed. The whole State is alive to this question, and many similar meetings are known to be contemplated for the near future.

EXTENSION SCHOOLS OF AGRICULTURE. — There has been a call from differents parts of the State for instruction of a more systematic and far-reaching nature than can be given in a single lecture or demonstration. Extension schools, five days in length, have been planned for West Brookfield, Walpole, Shelburne and Kingston. Several other applications for similar schools are already in file.

EDUCATIONAL TRAINS (STEAM AND TROLLEY). — In 1910, co-operating with the State Board of Agriculture, the State Forester and the Boston & Albany and Springfield trolley systems, a steam train (four cars), and a trolley train (five cars) were run through western Massachusetts. Stops of from one and one-half to two hours were made at Westfield, Pittsfield, Cheshire, North Adams, Chester, Springfield, Enfield, New Salem, Athol, Templeton, Barre, Ware, Palmer, East Brookfield, Worcester, Westborough, South Framingham, Milford, Amherst, South Hadley, Russell, Huntington, North Wilbraham, Brimfield, Sturbridge, Charlton, Oxford, Holden and Sterling. Inquiries have already come in asking when more of this kind of work will be carried on.

EDUCATIONAL EXHIBITS, LECTURES AND DEMONSTRATIONS AT FAIRS. — During the last two years the college has made extensive exhibits at fairs held in Barnstable, Worcester, Clinton, Greenfield, Amherst, Northampton, Topsfield, South Framingham and Amesbury; also at the New England Corn Show, the National Corn Show, Columbus, O., the Massachusetts Corn Show and the New England Industrial Exposition. At each fair five or six short practical talks and demonstrations have been given each day. Fair managers and the general public have been very appreciative of this work.

DEMONSTRATION ORCHARDS. — New orchards of from four to six acres each have been planted by the college in the towns of West Newbury, Westhampton, Sturbridge, Medway, Granville, Enfield and North Adams. Renovation plots have been selected in Hardwick, North Adams and North Grafton.

DAIRY IMPROVEMENT ASSOCIATIONS. — Two of these have been started during the year, one in the Connecticut valley and one in Norfolk County. Other sections of the State desire the college to organize similar associations, but so far we have been unable to find men to act as official testers.

THE M. A. C. AGRICULTURAL IMPROVEMENT ASSOCIATION. — This is an organization of ex-students of this college, banded together for the purpose of improving plants, animals and the conditions of rural life. There are now 110 members. The usefulness of this organization depends almost entirely on the ability of the college to furnish proper supervision for the organization and direction of the work.

AGRICULTURAL SURVEYS. — Through these surveys an attempt is made, by systematic study, to find out the exact conditions of farm management, including dairying, orcharding, poultry raising and other specialties, the income which is derived from these, and the facilities for marketing products. An inquiry into the social, educational, religious and moral life of rural communities is also made. Under the direction of Dr. Alexander E. Cance and two assistants, a fairly comprehensive survey of the town of Belchertown was made during the past summer.

ADVISORY WORK WITH STATE INSTITUTIONS, INDIVIDUALS, ETC. — From letters received from about 28 State institutions, it is evident that co-operation on the part of the college in the handling of the agricultural plants connected with these institutions would be warmly welcomed and is much desired. Some of these institutions have already been visited and help has been given. A large number of individuals have applied to the college for expert advice and help. It is possible to send men to only a small percentage of those who have asked for this personal help.

EXTENSION SERVICE PUBLICATIONS. — Each year, bulletins and circulars descriptive of the various short courses have been published. Each month, "Facts for Farmers" has been issued, and is much sought after. The titles of the pamphlets already published are as follows: "Directions for Selecting Corn for Exhibition," "Fall Spraying for Massachusetts Orchards," "The Possibility of Keeping Bees," "Some Good Books for Farmers and Others interested in the Affairs of the Country," "Pruning of Shade Trees," "Top Grafting Fruit Trees," "Feeding for Milk Production," "Home-mixed Fertilizers," "Summer Spraying," "The Feeding and Care of Chicks hatched artificially," "Home Vegetable Gardening," "Fruit for Exhibitions," "Pig Feeding," "Clean Milk." A list of desirable books on agriculture and rural social science is usually kept on hand for distribution.

STUDENT EXTENSION WORK. — About 30 of our college students have been doing volunteer work in the smaller towns near Amherst during the past two years. The communities reached have been Cushman, Sunderland, Leverett, Shutesbury, Pelham, Belchertown, South Amherst, Hadley, South Hadley, North Hadley, Dwight, Granby, Conway, Ashfield, Hatfield, Shelburne Falls, Three Rivers, Cummington and Northampton. The work has consisted chiefly in teaching English to foreigners, coaching school athletic teams, supervising contests, organizing debating societies, giving talks on clean living, conducting religious services, giving musical entertainments, teaching Bible classes, acting as judges at grange fairs, etc.

THE FAUNCE DEMONSTRATION FARM. — This farm, located at Sandwich, has been under the direction of a committee from our faculty, of which the Director of the Extension Service is chairman. The farm has demonstrated beyond a doubt that small fruits, vegetables and poultry can be raised at a profit on Cape Cod. Through the work of this farm the whole community has taken on new life. The superintendent of the farm, Mr. A. W. Doolittle, has taught agriculture in the schools of the village, and has given much help to the farmers of Barnstable County by his personal visits to farms.

BOYS' AND GIRLS' CLUBS. — This work has been under the direction of Prof. W. R. Hart and Assistant Prof. F. B. Jenks of the Department of Agricultural Education. The large numbers enrolled, and the interest that has been shown on the part of school superintendents, parents and pupils, will attest to the value of these clubs as a means of turning the attention of the young people in our smaller towns to the possibilities open to them in their home communities.

DEMONSTRATION FIELD PLOTS. — Aside from the work done by the members of the M. A. C. Agricultural Improvement Association, little has been done toward placing demonstration plots in different sections of the State. Co-operating with the Bureau of Plant Industry of the United States Department of Agriculture, four demonstration pasture plots have been placed on farms in the vicinity of Amherst, for a study of some method of improving the typical hill pastures of Massachusetts.

TRAVELING LIBRARIES. — Through the generosity of several of the leading publishers of agricultural books, in donating about 160 of the latest books on various agricultural subjects, the college has been able to place in circulation four traveling libraries. These they loaned to the libraries of small towns for a few weeks at a time, and the books are loaned to those interested in reading them. These libraries are in great demand.

CO-OPERATION WITH EXISTING ORGANIZATIONS. — The aim of those in charge of the Extension Service has, from the start, been to co-operate with existing organizations so far as possible. During the past two years we have co-operated with the State Board of Agriculture, the State Board of Health, the State Dairy Bureau, the State Grange, the Boston Chamber of Commerce, the Springfield Board of Trade, the county work of the Y. M. C. A., several village improvement associations, the Tent Evangelistic Work in western Massachusetts, the Y. M. C. A.'s of Worcester and Springfield, men's clubs in churches, women's clubs, the schools of a number of towns, and other agencies interested in the rural problem.

DISTRICT FIELD AGENTS. — Mr. Charles H. White (M. A. C. 1909) is now devoting part time to the work of field agent in southern Worcester County. Mr. White visits farms, and is ready, on consultation by farmers, to bring to the men the best advice the experts at the college can give. He attends grange meetings, farmers' institutes, and co-operates with all sorts of organizations on the arrangement of programs. He is available for conferences at all times with farmers on questions of farm management.

Through the Short Courses and the Extension Service, an effort is made to render the departments of the Massachusetts Agricultural College as helpful to the people of the Commonwealth as they can be. Correspondence is invited from any who desire such helps as have been spoken of. Letters should be addressed to the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

# GENERAL INFORMATION.

# GENERAL INFORMATION.

## A. FINANCIAL AND ADMINISTRATIVE.

### STUDENT EXPENSES.

TUITION. — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $40 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk, stating that the applicant's father is a legal resident of Massachusetts.

DORMITORIES AND BOARD. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bed rooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1.25 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $4 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

### EXPENSES.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts free; other citizens of the United States, $40 a year; foreigners, $120 a year.

| | Low. | High. |
|---|---|---|
| Room in college dormitories or in private houses, | $39 00 | $110 00 |
| Board in college dining hall, $4 a week, | 144 00 | 144 00 |
| Laundry, 50 cents to 85 cents a week, | 18 00 | 30 00 |
| Military uniform, first year, | 13 50 | 13 50 |
| Laboratory fees, | 2 00 | 20 00 |
| Books, stationery and other miscellaneous, | 23 50 | 32 50 |
| | $240 00 | $350 00 |

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student furniture in dormitories, either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $250 and $350 per year.

### *Laboratory Fees.*

The following laboratory fees are at present charged. The schedule is subject to modification without previous announcement in the catalogue.

| | Per Semester. |
|---|---|
| Botany: — | |
| Graduates, | $4 00 |
| Courses 2, 3, | 3 00 |
| Course 4, | 2 00 |
| Course 5, | 1 00 |
| Courses 7, 9, 11, 13, | 3 00 |
| Chemistry: — | |
| Courses 1, 2, 11, 13, 14, each, | 3 00 |
| Courses 4, 5, 6, each, | 4 00 |
| Courses 9, 10, 15, 17A, B, C or D, 18A, B, C or D, | 5 00 |
| Entomology: — | |
| Graduate, | 3 00 |
| Entomology 3, | 3 00 |
| Entomology 4, | 3 00 |
| Landscape gardening: — | |
| Landscape gardening 1, 2, | 2 50 |
| Landscape gardening 3, 4, 7, 8, | 4 00 |
| Landscape gardening 6, | 1 00 |
| Drawing 1, 2, | 2 50 |
| Zoölogy: — | |
| Elementary 1, | 2 00 |
| Invertebrate 3, | 4 00 |
| Vertebrate 4, | 4 00 |

## STUDENT AID.

SELF HELP. — A number of students find opportunities for earning money without depending upon the college to furnish them with work, and many are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for employment, no one man can receive a large amount of work through the college.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and thirty or more students are employed at the dining hall. Applications for student labor should be made directly to the president. Applicants are required to present a certificate, signed by parent or guardian and by one of the selectmen or aldermen of the town or city in which they reside, showing that the applicant needs the assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last year or two the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer.

The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

### STUDENT ACCOUNTS.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each semester. This rule is strictly adhered to, and no student will be allowed to register in his classes until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the semester he is more than one week in arrears in his payment for board.

All money due for student labor shall be applied on account toward any bills that a student may owe to the institution.

## B. COLLEGE ACTIVITIES.

### GENERAL EXERCISES.

Chapel exercises are held four mornings each week. On Wednesday, instead of chapel an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

### STUDENT ACTIVITIES.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about four years ago. All students become members of the Union by paying a small fee. The Union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. In the fall and winter months the Union gives a series of entertainments, free to the students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic Club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A Dramatic Club has been organized, and each year presents a play.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and tennis.

A Rifle Club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Signal," published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Scientific clubs also exist in the departments of French, entomology and landscape gardening.

## C. ACADEMIC AND DEPARTMENTAL.

### Degrees.

Those who complete a four-years course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10.

Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

## PRIZES.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1912 are: —

AGRICULTURE. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

BOTANY. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1912, a prize of $5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

GENERAL IMPROVEMENT. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declarations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

## Military Diplomas.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the department of military science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

## Equipment.

Agronomy. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a surveyor's transit, a wye level, drainage levels, rods, steel tapes, surveyor's pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

Animal Husbandry. — The most important part of the equipment for laboratory work in animal husbandry is the new judging pavilion, which will be completed by Jan. 1, 1911. This will give new opportunities for practice work in management of live stock, together with demonstrations in judging. Another very essential part of the equipment for this department is the live stock of the college farm, which includes pure bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach and Percheron horses, and Berkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

CHEMISTRY. — The department of chemistry occupies an entire building, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 84 students and that on the third floor 100 students. The laboratories for beginners have 80 working tables, which accommodate 180 students in sections. Each table is supplied with reagents and apparatus for independent work. Well-equipped organic, physiological and quantitative laboratories for advanced students are also provided. The weighing room connected with the quantitative laboratory has 11 balances. The equipment includes a valuable and growing collection of specimens and samples of rocky minerals, soils, raw and manufactured fertilizers, food, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Dairying. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

Dining Hall. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college.

Drawing. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

Entomology. — *Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped. It will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump, methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room, provided with chemical desks and apparatus, methods for the determination of the impurities and adulterations of insecticides are taught. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building, the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

FARM ADMINISTRATION. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

FLORICULTURE. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

FORESTRY. — The aim of the course in forestry is to prepare men for the advanced study in forestry schools, and at the same time, by laying particular stress on local conditions, to enable them to handle the farm wood lot in the same scientific manner as the rest of the farm. The college is well situated for forestry study. There is a good forest nursery on the college grounds; also two typical farm wood lots. In the vicinity are considerable areas of typical New England forest land.

GEOLOGY. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has 6 large cases for exhibition purposes.

The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, aboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library — stack room, reading room and office — occupies the entire lower floor of the library-chapel building. It contains nearly 34,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a select collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular and short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

MILITARY SCIENCE. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

PHYSICAL EDUCATION. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

POMOLOGY. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1909–10, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrous fruit from Florida and Texas.

PHYSICS. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Poultry Husbandry. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system) 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house 14 by 180 feet (when completed), which will accommodate 500 layers and furnish facilities for student work in pen management; the 6 old experiment station buildings, each 12 by 18 feet, to be used as breeding houses, and 11 colony brooder houses. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry, carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of Barred Plymouth Rocks, White Plymouth Rocks, White Wyandottes, Columbian Wyandottes, single-comb Rhode Island Reds, Light Brahmas, Buff Orpingtons and single-comb White Leghorns. The aim of the department is to keep good specimens of all the most popular varieties of chickens, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollege contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

Veterinary Science and Bacteriology. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. On the second floor is a laboratory, 20 by 32 feet, for advanced work. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus. Small aquaria and vivaria will be added.

The large amphitheater lecture hall is used jointly by the departments of entomology and zoölogy-geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 2 floor cases, with space for 10 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 5 P.M. The curator is Assistant Professor Gordon.

## PRIZES AWARDED FOR THE YEAR 1911.

GRINNELL PRIZES. — First prize, $25, Herman Alfred Pauly; second prize, $15, Robert Delano Lull; third prize, $10, Nathaniel Herbert Hill. The Macmillan Prize in Agriculture, consisting of one set of the "Cyclopedia of American Agriculture," to be awarded to the member of the junior class writing the best essay on any subject covered by the work of the division of agriculture: prize awarded to Mr. Howard Archibald Turner, 1912.

BOTANICAL PRIZES. — For the best herbarium submitted by a member of the sophomore class, $5, Mr. Lewis Floyd Drury.

GENERAL IMPROVEMENT PRIZE. — Given to that member of the sophomore class who, during his first two years in college, has shown the greatest improvement in scholarship, character, and example; $25, Mr. Nils Paul Larsen.

MILITARY HONORS. — The following-named cadet officers have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts as being efficient in military science and tactics, the first five graduating as honor men in the military department and the next five as distinguished graduates in the department. Honor graduates: Cadet Col. Samuel Raynolds Parsons; Cadet Maj. Allyn Parker Bursley; Cadet Maj. Harold Francis Willard; Cadet Capt. Arthur Harris Sharpe; Cadet Capt. Percy William Pickard. Distinguished graduates: Cadet Capt. Irving Craig Gilgore; Cadet Capt. Edward Arthur Larrabee; Cadet Capt. Frederick Adams McLaughlin; Cadet Capt. Herbert Jonathan Baker; Cadet First Lieut. Phileas Armand Racicot.

## SECRETARIES OF ALUMNI ASSOCIATIONS AND CLASSES.

Alumni Secretaries' Association of the Massachusetts Agricultural College.

*Secretary:* RALPH J. WATTS, 1907, Amherst, Mass.

Associate Alumni of the Massachusetts Agricultural College.
*Secretary:* SIDNEY B. HASKELL, 1904, Amherst, Mass.

Local Alumni Association of the Massachusetts Agricultural College.
*Secretary:* SIDNEY B. HASKELL, 1904, Amherst, Mass.

Alumni Club of Massachusetts.
*Clerk:* H. LINWOOD WHITE, 1909, 136 State House, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
*Secretary:* CHARLES L. BROWN, 1894, 870 State Street, Springfield, Mass.

Massachusetts Agricultural College Club of New York.
*Secretary:* JOHN ASHBURTON CUTTER, 1882, 262 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.
*Secretary:* CLARENCE H. GRIFFIN, 1904, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
*Secretary:* CHARLES A. TIRRELL, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
*Secretary:* THOMAS F. HUNT, 1905, Berkeley, Cal.

## *Class Secretaries.*

| Class of | SECRETARY. | Secretary's Address. |
|---|---|---|
| 1871 | E. E. Thompson, . . | 5 Jaques Avenue, Worcester, Mass. |
| 1872 | S. T. Maynard, . . | Northborough, Mass. |
| 1873 | C. Wellington, . . | Amherst, Mass. |
| 1874 | D. G. Hitchcock, . . | Warren, Mass. |
| 1875 | M. Bunker, . . . | Newton, Mass. |
| 1876 | C. Fred Deuel, . . | Amherst, Mass. |
| 1877 | Atherton Clark, . . | Newton, Mass. |
| 1878 | C. O. Lovell, . . . | 5 Bromfield Street, Boston, Mass. |
| 1879 | R. W. Swan, . . . | 41 Pleasant Street, Worcester, Mass. |
| 1880 | Alvan Fowler, . . | 413 Post Office Building, Philadelphia, Pa. |
| 1881 | J. L. Hills, . . . | 55 North Prospect Street, Burlington, Vt. |
| 1882 | G. D. Howe, . . . | 25 Winter Street, Bangor, Me. |
| 1883 | J. B. Lindsey, . . | Amherst, Mass. |
| 1884 | – – | – – |
| 1885 | E. W. Allen, . . . | 1923 Biltmore Street, Washington, D. C. |
| 1886 | Dr. Winfield Ayres, . | 616 Madison Avenue, New York City. |
| 1887 | F. H. Fowler, . . | Shirley, Mass. |
| 1888 | H. C. Bliss, . . . | 14 Mechanic Street, Attleborough, Mass. |
| 1889 | C. S. Crocker, . . | 2453 Carpenter Street, Philadelphia, Pa. |
| 1890 | David Barry, . . | Amherst, Mass. |
| 1891 | H. T. Shores, . . . | 117 Elm Street, Northampton, Mass. |
| 1892 | H. M. Thomson, . . | Amherst, Mass. |
| 1893 | F. A. Smith, . . . | Turner Hill, Ipswich, Mass. |
| 1894 | S. F. Howard, . . | Amherst, Mass. |
| 1895 | E. A. White, . . . | Amherst, Mass. |
| 1896 | A. S. Kinney, . . | South Hadley, Mass. |
| 1897 | C. A. Peters, . . . | Amherst, Mass. |
| 1898 | – – | – – |
| 1899 | D. A. Beaman, . . | Rio Piedras, Porto Rico. |
| 1900 | E. K. Atkins, . . . | 15 Hubbard Avenue, Northampton, Mass. |
| 1901 | J. H. Chickering, . . | Dover, Mass. |
| 1902 | H. L. Knight, . . | United States Department of Agriculture, Washington, D. C. |
| 1903 | G. D. Jones, . . . | North Amherst, Mass. |
| 1904 | P. F. Staples, . . . | North Grafton, Mass. |
| 1905 | P. F. Williams, . . | Auburn, Ala. |
| 1906 | Richard Wellington, . | Geneva, N. Y. |
| 1907 | J. N. Summers, . . | 48 Copeland Street, Campello, Mass. |
| 1908 | J. A. Hyslop, . . . | Bureau of Entomology, Washington, D. C. |
| 1909 | C. S. Putnam, . . | Walpole, N. H. |
| 1910 | F. L. Thomas, . . | Amherst, Mass. |
| 1911 | L. M. Johnson, . . | Newtown, Conn. |

# DEGREES CONFERRED AND ROLL OF STUDENTS.

# DEGREES CONFERRED—1911.

## DOCTOR OF PHILOSOPHY.

Shaw, Jacob Kingsley, North Amherst, University of Vermont, B.Sc., Massachusetts Agricultural College, M.Sc., 1908.

Summers, John Nicholas, Campello, Massachusetts Agricultural College, B.Sc., 1907.

## MASTER OF SCIENCE.

Smith, Philip Henry, Amherst, Massachusetts Agricultural College, B.Sc., 1897.

Whitmarsh, Raymond Dean, Amherst, Massachusetts Agricultural College, B.Sc., 1908.

## BACHELOR OF SCIENCE (B.SC.).

| | |
|---|---|
| Adams, James Fowler, | Melrose. |
| Allen, Park West, | Westfield. |
| Baker, Herbert Jonathan, | Selbyville, Del. |
| Barrows, Raymond Corbin, | Stafford Springs, Conn. |
| Bentley, Arnold Gordon, | Hyde Park. |
| Blaney, Herbert Wardwell, | Swampscott. |
| Brown, Edgar Morton, | Merrick. |
| Bursley, Allyn Parker, | West Barnstable. |
| Conant, Arthur Theodore, | Sunderland. |
| Damon, Charles Murray, | Haydenville. |
| Davis, Egbert Norton, | South Framingham. |
| Davis, Irving Wilder, | Lowell. |
| Gilgore, Irvin Craig, | Central Square, N. Y. |
| Hill, Nathaniel Herbert, | Princeton, N. J. |
| Jenks, Albert Roscoe, | Three Rivers. |
| Johnson, Leonard Matthews, | Easthampton. |
| Labouteley, Gaston Edward, | Lynn. |
| Larrabee, Edward Arthur, | Medford. |
| Lull, Robert Delano, | Windsor, Vt. |
| McGraw, Frank Dobson, | Fall River. |
| McLaughlin, Frederick Adams, | Lee. |
| Morse, Henry Bowditch, | Salem. |
| Nagai, Isaburo, | Tokyo, Japan. |
| Nickerson, George Payne, | Amherst. |
| Nielsen, Gustaf Arnold, | West Newton. |
| Ostrolenk, Bernhard, | Gloversville, N. Y. |
| Parsons, Samuel Raynolds, | North Amherst. |

| | |
|---|---|
| Patch, Roland Harrison, | Wenham. |
| Pauly, Herman Alfred, | Plainfield, Vt. |
| Pickard, Percy William, | Hopedale. |
| Piper, Ralph Waldo, | South Acton. |
| Prouty, Philip Herman, | Shrewsbury. |
| Racicot, Phileas Armand, | Lowell. |
| Robinson, Ralph Cushing, | Boston. |
| Sharpe, Arthur Harris, | Saxonville. |
| Smith, Clarence Albert, | Northampton. |
| Smith, Raymond Goodale, | Lynn. |
| Stevenson, Lomas Oswald, | Hackensack, N. J. |
| Titus, Willard McCready Snow, | New Braintree. |
| Warren, Edward Erving, | Leicester. |
| Whitney, Raymond Lee, | Brockton. |
| Willard, Harold Francis, | Leominster. |
| Winn, Ervin Lawrence, | Holden. |

# ROLL OF STUDENTS.

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## SENIOR CLASS.

| | | |
|---|---|---|
| Ackerman, Arthur John, | Worcester, | 7 South College. |
| Baker, Horace Mitchell, | Selbyville, Del., | South College Tower. |
| Beals, Carlos Loring, | Sunderland, | 5 South College. |
| Beers, Rowland Trowbridge, | Billerica, | 8 North College. |
| Bent, William Richard, | Marlborough, | 2 North College. |
| Bodfish, Edward Hill, | West Barnstable, | Plant House. |
| Boland, Eric Nichols, | South Boston, | 17 South College. |
| Brett, Alden Chase,[1] | North Abington, | 81 Pleasant Street. |
| Brown, Merle Raymond, | Greenwich Village, | 92 Main Street, Amherst. |
| Burr, Frederick Huntington, | Worthington, | 88 Pleasant Street. |
| Caldwell, Lawrence Sanborn, | Lynnfield Center, | Kappa Sigma House. |
| Carpenter, Jesse, Jr.,[1] | Attleborough, | Kappa Sigma House. |
| Castle, Fred Arlo, | Roseburg, Ore., | 13 South College. |
| Clapp, Raymond Kingsley, | Westhampton, | Theta Chi House. |
| Curran, Daniel Joseph, | Marlborough, | 2 North College. |
| Deming, Winfred Griswold, | Wethersfield, Conn., | 16 South College. |
| Dodge, Albert Wesley,[1] | Hamilton, | 14 North College. |
| Fagerstrom, Leon Emanuel, | Worcester, | 12 South College. |
| Fisherdick, Warren Francis, | Amherst, | 26 South Pleasant Street. |
| Fitts, Frank Orus, | North Amherst, | Chemical Laboratory. |
| Fitzgerald, John Joseph, | Holyoke, | 75 Pleasant Street. |
| Fowler, George Scott, | Wayland, | 44 Pleasant Street. |
| Gallagher, James Andrew, | North Wilmington, | 3 North College. |
| Gaskill, Lewis Warren, | Hopedale, | 6 South College. |
| Gelinas, Louis Edmond, | North Adams, | 4 South College. |
| Gibbs, Robert Morey, | Chester, | Plant House. |
| Gibson, Lester Earl, | Melrose, | Kappa Sigma House. |
| Gray, Frank Leonard, | East Boston, | 21 Fearing Street. |
| Hall, Henry Bass,[1] | Northampton, | Paradise Road. |
| Hall, Horace Whitney,[1] | Newton Center, | P. O. Building, Amherst. |
| Hallowell, Royal Norton, | Jamaica Plain, | South College Tower. |
| Hamblin, Stephen Francis, | Marston Mills, | 94 Pleasant Street. |
| Harlow, Joseph Alvin, | Turners Falls, | Kappa Sigma House. |
| Heald, Jay Morrill, | Watertown, | 10 South College. |
| Hemenway, Thomas, | Nashua, N. H., | 17 South College. |
| Hickey, Francis Benedict,[1] | Brockton, | C. S. C. House. |
| Hills, Frank Burrows,[1] | Bernardston, | 8 South College. |
| Holland, Henry Lucine, | Amherst, | 28 North Prospect Street. |
| Hubert, Benjamin Franklin, | White Plains, Ga., | 48 E. Pleasant Street. |
| Kingsbury, Arthur French, | Medfield, | Theta Chi House. |
| Lamson, Robert Ward, | Amherst, | 51 Pleasant Street. |
| Lin, Dau Yang, | Shanghai, China, | 21 Fearing Street. |
| Lodge, Charles Albert, | Manchester, | 87 Pleasant Street. |
| Lloyd, Edward Russell,[1] | Boston, | 15 North College. |
| Madison, Francis Spink, | East Greenwich, R. I., | Veterinary Laboratory. |
| Martin, James Francis, | Amherst, | 19 South East Street. |
| McGarr, Thomas Anthony, | Worcester, | 3 North College. |
| Merkle, George Edward, | Amherst, | North East Street. |
| Merrill, Fred Sawyer, | Danvers, | C. S. C. House. |
| Moreau, Theodore Joseph, | Turners Falls, | 10 South College. |

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[1] Work incomplete.

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|---|---|---|
| Mueller, Alfred Frederick, | Jamaica Plain, | 4 South College. |
| Noyes, Harry Alfred, | Marlborough, | 79 Pleasant Street. |
| O'Flynn, George Bernhard, | Worcester, | Kappa Gamma Phi House. |
| Parker, Ralph Robinson, | Malden, | C. S. C. House. |
| Pearson, Charles Cornish, | Arlington, | 18 South College. |
| Peckham, Curtis, | New Bedford, | 7 North College. |
| Philbrick, William Edwin, | Taunton, | 18 South College. |
| Pierpont, John Edwards, | Williamsburg, | C. S. C. House. |
| Pratt, Marshall Cotting, | Holderness, N. H., | Kappa Sigma House. |
| Puffer, Stephen Perry, | North Amherst, | 8 North College. |
| Raymond, Arthur Nathaniel, | Leominster, | 9 North College. |
| Reed, Robert Edward,[1] | Abington, | Theta Chi House. |
| Robinson, Earle Johnson,[1] | Hingham, | 8 South College. |
| Rockwood, Lawrence Peck, | Waterbury, Conn., | 116 Pleasant Street. |
| Sanctuary, William Crocker, | Amherst, | Mill Valley. |
| Sellew, Lewis Raymond, | Natick, | Plant House. |
| Shaw, Ezra Ingram, | Amherst, | East Street. |
| Southwick, Benjamin Gilbert, | Buckland, | 11 North College. |
| Stack, Herbert James, | Conway, | French Hall. |
| Terry, Leon,[1] | Springfield, | 12 North College. |
| Torrey, Ray Ethan, | North Leverett, | Clark Hall. |
| Tower, Daniel Gordon, | Roxbury, | 15 South College. |
| Tupper, George Wilbur, | Roxbury, | C. S. C. House. |
| Turner, Howard Archibald, | Dorchester, | Plant House. |
| Wales, Robert Webster, | North Abington, | Kappa Sigma House. |
| Walker, Herman Chester, | Marlborough, | 16 South College. |
| Warner, Roger Andrew,[1] | Sunderland, | Theta Chi House. |
| Weaver, William Jack, | Alandar, | 15 North College. |
| Whitney, Charles Everett, | Wakefield, | 10 North College. |
| Wilbur, Emory Sherman, | East Wareham, | 79 Pleasant Street. |
| Wilde, Earle Irving, | Taunton, | 2 South College. |
| Williams, Edward Roger, | Concord, | 12 South College. |
| Williams, Silas, | Fall River, | Theta Chi House. |
| Wood, Howard Holmes, | Shelburne Falls, | 15 South College. |
| Young, Edwin Burnham, | Dorchester, | 11 North College. |

### JUNIOR CLASS.

| | | |
|---|---|---|
| Adams, Winfred Frederic,[1] | East Leverett, | 83 Pleasant Street. |
| Allen, Harry Willis, | Amherst, | South Street, West Pelham. |
| Anderson, Oscar Gustaf,[1] | East Pepperell, | Entomological Building. |
| Angier, Harris William, | Westborough, | 88 Pleasant Street. |
| Baird, Harry Albert,[1] | Somerville, | 29 Lincoln Avenue. |
| Baker, Dean Foster, | Fairhaven, | 116 Pleasant Street. |
| Barber, George Ware,[1] | Franklin, | 13 North College. |
| Bevan, Lawrence Algur,[1] | Newtonville, | 84 Pleasant Street. |
| Blake, Ralph Cedric,[1] | Wollaston, | President's House, M. A. C. |
| Birdsall, Webster Jennings,[1] | Otego, N. Y., | Kappa Sigma House. |
| Borden, Ralph James, | Fall River, | 7 North College. |
| Brewer, Charlesworth Herbert, | Mt. Vernon, N. Y., | C. S. C. House. |
| Brown, Herbert Augustine,[1] | Saxonville, | Brooks Farm. |
| Burby, Lawrence Walter,[1] | Chicopee Falls, | 88 Pleasant Street. |
| Bursley, Harold Barrows, | Peabody, | Theta Chi House. |
| Caldwell, David Story, | South Byfield, | 9 North College. |
| Carver, John Stuart, | Roslindale, | C. S. C. House. |
| Chun, Woon Young,[1] | Shanghai, China, | 90 Pleasant Street. |
| Clark, Norman Russell,[1] | Worcester, | Theta Chi House. |
| Cobb, Joseph Boyd,[1] | Chicopee Falls, | 5 North College. |
| Cole, Arlin Tower, | West Chesterfield, | Pease Avenue, care of Mr. Reed. |
| Cole, Flora Atwood, | Newton, | 10 Draper Hall. |
| Coleman, Isaac[1], | Amherst, | 12 North College. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Cooper, Everett Hanson, | Wakefield, | 14 North College. |
| Cory, Harold,[1] | Rutherford, N. J., | 15 Beston Street. |
| Covill, Joseph Warren,[1] | West Roxbury, | 7 South College. |
| Cristman, Clyde Edward, | Dalton, | Pease Avenue, care of Mr. Reed. |
| Culley, Frank Hamilton, | Marshalltown, Ia., | 77 Pleasant Street. |
| Curtis, Harold William, | Belchertown, | Entomological Building. |
| Daniel, Edward Stephen Coen, | Osterville, | 15 Fearing Street. |
| Dayton, James Wilson, | South Norwalk, Conn., | 15 Beston Street. |
| Dooley, Thomas Patrick,[1] | South Boston, | 35 East Pleasant Street. |
| Drury, Lewis Floyd, | Rutland, | 120 Pleasant Street. |
| Edminster, Albert Franklin, | Brooklyn, N. Y., | 5 South College. |
| Eisenhaure, John Louis,[1] | North Reading, | Brooks Farm. |
| Ellis, Benjamin Ward, | Plymouth, | Clark Hall. |
| Ells, Gordon Waterman, | Haverhill, | 116 Pleasant Street. |
| Fay, Robert Sedgwick, | Monson, | 84 Pleasant Street. |
| Forbush, Wallace Clifford, | Rutland, | 79 Pleasant Street. |
| French, James Dudley, | Hyde Park, | 116 Pleasant Street. |
| Gaskill, Ralph Hicks, | Amherst, | 15 Hallock Street. |
| Godvin, Thomas Joseph,[1] | Jamaica Plain, | 75 Pleasant Street. |
| Gore, Harold Martin, | Wollaston, | 11 South College. |
| Greenleaf, George Freeman,[1] | Brockton, | 21 Fearing Street. |
| Griggs, Frederick David, | Chicopee Falls, | 5 North College. |
| Harris, Burton Adams, | Wethersfield, Conn., | 84 Pleasant Street. |
| Hasey, Willard Harrison,[1] | Campello, | 87 Pleasant Street. |
| Hatch, Herbert Tilden, | Beverly, | East Experiment Station. |
| Headle, Herbert Wallace, | Bolton, | Plant House. |
| Headle, Marshall, | Bolton, | Plant House. |
| Holden, James Loomis, | Palmer, | 5 McClellan Street. |
| Howe, Glover Elbridge, | Marlborough, | 11 South College. |
| Howe, Ralph Wesley, | East Dover, Vt., | Wilder Hall. |
| Huntington, Samuel Percy, | Lynn, | 96 Pleasant Street. |
| Hutchings, Herbert Colby, | South Amherst, | 87 Pleasant Street. |
| Hyland, Harold Wilson,[1] | Weymouth, | Old Insectary. |
| Jones, Harold Frederick, | Campello, | West Experiment Station. |
| Jordan, Simon Miller, | Rutherford, N. J., | 9 South College. |
| Kelley, Albert Joseph, | Roxbury, | 35 East Pleasant Street. |
| Kelley, Bernard Jenkins,[1] | Harwichport, | Brooks Farm. |
| Kenney, Frederick Alfred,[1] | Charlestown, | Theta Chi House. |
| Larsen, Nils Paul, | Bridgeport, Conn., | Clark Hall. |
| Lesure, John Warren Thomas, | Fitchburg, | 94 Pleasant Street. |
| Little, Willard Stone, | Newburyport, | 66 Pleasant Street. |
| Lowry, Quincy Shaw,[1] | Canton, | 6 South College. |
| Lundgren, Arthur Robert, | Orange, | Theta Chi House. |
| Lyon, Harold, | Somerville, | 13 Phillips Street. |
| Macone, Joseph Augustine, | Concord, | 1 North College. |
| Mallett, George Alfred, | Bridgeport, Conn., | 13 North College. |
| Matz, Julius,[1] | Boston, | 112 Pleasant Street. |
| Mayer, John Lawrence, | South Boston, | 35 East Pleasant Street. |
| McDougall, Allister Francis, | Westford, | 6 North College. |
| Moir, William Stuart, | Boston, | Theta Chi House. |
| Murray, Joseph Wilbur, | Holyoke, | 96 Pleasant Street. |
| Neal, Ralph Thomas, | Mattapan, | Old Insectary. |
| Nichols, Norman Joseph, | Everett, | Mathematics Building. |
| O'Brien, James Leo,[1] | Wayland, | 19 Hallock Street. |
| Packard, Clyde Monroe, | Springfield, | Cottage Hospital, Kellogg Avenue. |
| Pease, Lester Newton, | Meriden, Conn., | 84 Pleasant Street. |
| Pillsbury, Joseph James,[1] | West Bridgewater, | 8 South Prospect Street. |
| Post, George Atwell,[1] | Richmond Hill, N. Y., | Theta Chi House. |
| Roberts, Clarence Dwight,[1] | Edinburgh, Scot., | Brooks Farm. |
| Roehrs, Herman Theodore,[1] | New York, N. Y., | Kappa Sigma House. |

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[1] Work incomplete.

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|---|---|---|
| Rosebrooks, Walter Edwin, | Millbury, | 15 Hallock Street. |
| Samson, Stuart Dodds, | Grand Isle, Vt., | Kappa Sigma House. |
| Selden, John Lincoln,[1] | Northampton, | 6 Ahwaga Avenue, Northampton. |
| Serex, Paul, Jr., | Jamaica Plain, | 116 Pleasant Street. |
| Sheehan, Dennis Anthony,[1] | South Lincoln, | 1 North College. |
| Shute, Carl August,[1] | Hampden, | 14 South College. |
| Streeter, Charles Marsh, | Brimfield, | 79 Pleasant Street. |
| Thayer, Clark Leonard, | Enfield, | West Experiment Station. |
| Tucker, Waldo Guy, | Lynn, | Mathematics Building. |
| Tupper, Arthur Somerville, | Roxbury, | C. S. C. House. |
| Van Zwaluwenburg, Reyer Herman, | Rutherford, N. J., | East Experiment Station. |
| Walker, Charles Dexter, | Greenwich Village, | 14 South College. |
| Whitney, Francis Wellington,[1] | Wellesley, | 4 North College. |
| Zabriskie, George 2d,[1] | New York City, | 83 Pleasant Street. |

## SOPHOMORE CLASS.

| | | |
|---|---|---|
| Abbott, Leslie Elmer, | Sandwich, | Care of Mr. E. F. Gaskill. |
| Allen, Carl Murdough, | Holyoke, | 87 Pleasant Street. |
| Allen, Henry Dickinson,[1] | Lynn, | 82 Pleasant Street. |
| Anapolsky, Morris,[1] | Boston, | 11 Amity Street. |
| Anderson, Leslie Oscar,[1] | Concord, | 7 Nutting Avenue. |
| Baker, Warren Sears,[1] | Wollaston, | 116 Pleasant Street. |
| Besser, Sidney Stokes, | Gilbertville, | 3 Nutting Avenue. |
| Black, Harold Cotting,[1] | Falmouth, | 3 Pleasant Street, |
| Bokelund, Chester E.,[1] | Worcester, | 66 Pleasant Street. |
| Bragg, Ralph Stanley, | Milford, | Mt. Pleasant, care of Professor White. |
| Brewer, Harold William,[1] | Mount Vernon, N. Y., | C. S. C. House. |
| Brooks, Arthur Winslow, | Enfield, | Chemical Laboratory. |
| Brown, Harry Dunlap, | Lowell, | 82 Pleasant Street. |
| Bullard, Alvan Henry, | South Framingham, | 5 McClellan Street. |
| Calvert, Melville Bradford,[1] | New London, Conn., | 56 Pleasant Street. |
| Campbell, Malcolm David, | Still River, | 35 East Pleasant Street. |
| Christie, Edward Wheeler, | North Adams, | 29 Lincoln Avenue. |
| Churchill, George Clarence, | Worcester, | 58 Pleasant Street. |
| Clark, Ernest Samuel, Jr., | Tolland, | 82 Pleasant Street. |
| Clay, Harold Johnson, | North Cambridge, | 21 Fearing Street. |
| Clegg, Frank Jackson, | Fall River, | C. S. C. House. |
| Coe, Alfred Lyne, | Cazenovia, N. Y., | 79 Pleasant Street. |
| Cole, Herbert Elmer,[1] | Manchaug, | Plant House. |
| Coleman, David Augustus, | South Framingham, | 108 Pleasant Street. |
| Damon, Samuel Reed,[1] | Kingston, R. I., | Kappa Sigma House. |
| Davies, Lloyd Garrison,[1] | Peabody, | 75 Pleasant Street. |
| Davis, Ralph Edward, | Southbury, Conn., | 77 Pleasant Street. |
| Davis, William Ashmun, | Sunderland, | 79 Pleasant Street. |
| Dearing, Newton Howard, | Brookline, | 7 Nutting Avenue. |
| Demond, Robert Norton, | North Adams, | Care of Mr. E. H. Forristall. |
| Dexter, Evans King, | Mattapoisett, | 31 East Pleasant Street. |
| Dunbar, Erving Walker, | North Weymouth, | 7 Nutting Avenue. |
| Edgerton, Almon Morley,[1] | West Springfield, | 6 Nutting Avenue. |
| Edwards, Edward Clinton,[1] | Salem, | Nutting Avenue, care of R. J. Watts. |
| Eldridge, Harold Lockwood, | Wareham, | North College, College Store. |
| Foster, Stuart Brooks,[1] | West Somerville, | 96 Pleasant Street. |
| Freeborn, Stanley Barron, | Ware, | 116 Pleasant Street. |
| Freedman, Samuel Leavitt, | Roxbury, | 101 Pleasant Street. |
| Frost, Robert Theodore, | New York, N. Y., | 85 Pleasant Street. |
| Frye, Carl Raymond, | South Hadley Falls, | 116 Pleasant Street. |
| Fuller, George, | Deerfield, | 86 Pleasant Street. |
| Gibson, David Wyman, | Groton, | 116 Pleasant Street. |
| Grebin, Mark Anthony,[1] | North Hadley, | North Hadley. |

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[1] Work incomplete.

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|---|---|---|
| Griffin, William Gerald, | South Hadley Falls, | 35 East Pleasant Street. |
| Hadfield, Harold Frederick, | North Adams, | 29 Lincoln Avenue. |
| Handy, Ralph Ellis, | Cataumet, | 10 North College. |
| Harris, Rodney Wells, | Wethersfield, Conn., | 77 Pleasant Street. |
| Hayden, William Vassall,[1] | Beverly, | 13 South College. |
| Hazen, Edward Leonard, | Springfield, | Care of Mr. E. H. Forristall. |
| Heath, Chester Blanchard, | Needham, | 4 North College. |
| Hebard, Emory Blodgett, | Holland, | 3 Fearing Street. |
| Heffron, Frederick, | Sherborn, | 108 Pleasant Street. |
| Hogg, Lawrence Jagger, | Lawrence, | 13 Fearing Street. |
| Howard, Lewis Phillips, | North Easton, | 19 Hallock Street. |
| Hutchinson, John Gouvernour, | Arlington, | 8 Allen Street. |
| Hutchinson, Raymond Ernest,[1] | South Hanson, | 35 East Pleasant Street. |
| Ingham, Earl Morris, | Granby, | 86 Pleasant Street. |
| Jacobs, Loring Humphrey, | Wellesley, | 25 Pleasant Street. |
| Jenney, Herbert Hedge, | South Boston, | 6 Nutting Avenue. |
| Johnson, Rollin Eugene, | Templeton, | 120 Pleasant Street. |
| Jones, Dettmar Wentworth, | Melrose, | 66 Pleasant Street. |
| Kilbourn, Walton Goss, | South Lancaster, | 85 Pleasant Street. |
| Kriebel, Addison Reiff,[1] | Norristown, Pa., | 81 Pleasant Street. |
| Leach, Benjamin Robert, | Methuen, | 13 Phillips Street. |
| Leete, Richard Fowler, | Mount Kisco, N. Y., | 66 Pleasant Street. |
| Levine, Henry Walter, | Roxbury, | 101 Pleasant Street. |
| Lincoln, Murray Danforth, | North Raynham, | 19 Hallock Street. |
| Lucas, Hoyt Dennis, | West Springfield, | 1 Allen Street. |
| MacDonald, Daniel Alfred,[1] | Walpole, | 67 Pleasant Street. |
| Major, Joseph, | Rutherford, N. J., | 58 Pleasant Street. |
| Melloon, Ralph Reid, | Lowell, | Mt. Pleasant, care of Mr. Greene. |
| Merkle, Frederick Grover, | Amherst, | North East Street. |
| Morrison, Harold Ivory, | Melrose, | 77 Pleasant Street. |
| Morse, Harold John,[1] | Townsend, | 75 Pleasant Street. |
| Needham, Lester Ward,[1] | Springfield, | Kappa Sigma House. |
| Nicolet, Tell William, | Fall River, | 85 Pleasant Street. |
| Nicolet, Theodore Arthur,[1] | Fall River, | 85 Pleasant Street. |
| Nissen, Harry, | Boston, | 85 Pleasant Street. |
| Norton, Leslie Howard, | Newport, R. I., | 79 Pleasant Street. |
| Nute, Raymond Edwin, | Fall River, | 9 Fearing Street. |
| Oertel, John Thomas,[1] | South Hadley Falls, | 116 Pleasant Street. |
| Palmer, John Philip,[1] | Portsmouth, N. H., | Care of President Butterfield. |
| Parker, Ervine Franklin, | Poquonock, Conn., | 81 Pleasant Street. |
| Payne, Roland Alfred, | Wakefield, | North Amherst. |
| Pellett, John Doubleday, | Worcester, | Theta Chi House. |
| Peters, Chester Harry, | Brown Station, N. Y., | 116 Pleasant Street. |
| Petersen, Peverill Oscar, | Concord, | 7 Nutting Avenue. |
| Porter, Bennett Allen, | Amherst, | R. D. 1, No. 25, Amherst. |
| Powers, Richard Henry,[1] | Malden, | 9 South College. |
| Read, Frederick William, | Boston, | 7 Nutting Avenue. |
| Rees, Harry Launcelot, | Monson, | 3 Fearing Street. |
| Reid, George Alexander, | Worcester, | 52 Lincoln Avenue. |
| Robinson, Herbert Calvin, | Haverhill, | 75 Pleasant Street. |
| Russell, Alden Hesseltine, | Watertown, | 7 Nutting Avenue. |
| Sahr, Gabriel Arthur,[1] | Boston, | 60 Pleasant Street. |
| Sanford, Clarence Higgins, | Allston, | Cottage Hospital, Kellogg Avenue. |
| Sherman, Joel Powers, | Hyannis, | 4 North College. |
| Shirley, John Newton, | South Duxbury, | 30 North Prospect Street. |
| Simmons, George Walker,[1] | Amsterdam, N. Y., | 35 East Pleasant Street. |
| Slein, Owen Francis, | New Braintree, | 9 Nutting Avenue. |
| Small, Francis Willard,[1] | North Truro, | 35 North Prospect Street. |
| Smith, Leon Edgar, | Brighton, | 85 Pleasant Street. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Smith, Leone Ernest, | Leominster, | 116 Pleasant Street. |
| Stevens, Arthur Eben, | Brockton, | 79 Pleasant Street. |
| Strange, Sarah Josephine, | Marshfield, | 6 Draper Hall. |
| Sullivan, Arthur James, | Rochester, N. Y., | 19 Hallock Street. |
| Tarbell, Munroe Gifford, | Brimfield, | College Store, North College. |
| Taylor, Arthur Wright, | Feeding Hills, | 13 Fearing Street. |
| Taylor, Leland Hart, | Peabody, | 75 Pleasant Street. |
| Thurston, Arthur Searle, | Everett, | 9 Fearing Street. |
| Tower, Alfred Leigh, | Sheffield, | 120 Pleasant Street. |
| Tsang, Oong Hyuen, | Shanghai, China, | 26 Lincoln Avenue. |
| Upton, Ernest Franklin, | Salem, | Nutting Avenue, care of R. J. Watts. |
| Walker, Nathaniel Kennard, | Malden, | 83 Pleasant Street. |
| Walker, Raymond Philip, | Taunton, | 120 Pleasant Street. |
| Warner, Raymond Winslow, | Sunderland, | Care of Mr. E. H. Forristall. |
| Webster, Louis Armstrong, | Blackstone, | 82 Pleasant Street. |
| Weigel, Arthur George, | Lawrence, | 13 Hallock Street. |
| Wells, Nathan Holmes,[1] | Kennebunk, Me., | Prospect House. |
| Wheeler, Chester Eaton, | Lowell, | 87 Pleasant Street. |
| Whidden, Burton Clark, | Waltham, | 81 Pleasant Street. |
| Whippen, Charles Warren, | Lynn, | 13 Phillips Street. |
| White, Samuel Alexander, | Boston, | 12 Hallock Street. |
| Williams, George Edward,[1] | Belchertown, | Belchertown. |
| Wing, John Govan, | Somerville, | 116 Pleasant Street. |
| Wood, Henry Joseph, | Mendon, | 82 Pleasant Street. |
| Wooley, Harold Curtis,[1] | Malden, | Kappa Sigma House. |

### FRESHMAN CLASS.

| | | |
|---|---|---|
| Alden, Charles Harold, | Amherst, | East Pleasant Street. |
| Allen, Francis Ellwood, | Melrose, | 10 Allen Street. |
| Anderson, Herbert Henry, | Ware, | 13 Hallock Street. |
| Archibald, Herbert Hildreth, | Waltham, | 120 Pleasant Street. |
| Baird, Earle Fairbank, | Waltham, | 120 Pleasant Street. |
| Banister, Seth Warren, | Westford, | 30 North Prospect Street. |
| Barnes, Dwight Fletcher, | Marshfield, | 3 Nutting Avenue. |
| Bartlett, Emory Haynes, | Enfield, | 12 Cottage Street. |
| Bartlett, Edward Russell, | Newburyport, | 66 Pleasant Street. |
| Bartley, Hastings Newcomb, | Sandwich, | 77 Pleasant Street. |
| Beebe, William Carleton, | Evans Mills, N. Y., | Prospect House. |
| Beers, Norman Lauer, | Somerville, | 21 Fearing Street. |
| Bemis, Willard Gilbert, | North Brookfield, | 12 Cottage Street. |
| Bennett, John Ingram, | Boston, | 77 Pleasant Street. |
| Bisbee, Eleanor, | Arlington Heights, | Draper Hall. |
| Bishop, Chester Allen, | Peterboro, N. H., | 79 Pleasant Street. |
| Bishop, Herbert Walker,[1] | Doylestown, Pa., | 79 Pleasant Street. |
| Bittinger, Fritz John, | Plymouth, | 96 Pleasant Street. |
| Boyer, Edward E. Hale, | Lynn, | Northampton Road. |
| Braley, Merton Loring, | Rock, | East Experiment Station. |
| Bredemeier, Carl, | Buffalo, N. Y., | 86 Pleasant Street. |
| Bronson, Harold Julius, | Buckland, | Walker Hall. |
| Brooks, Gardner Milton, | Newton, | 9 Allen Street. |
| Buttrick, John Willard, | Melrose, | 31 North Prospect Street. |
| Cale, Gladstone Hume, | West Springfield, | 79 Pleasant Street. |
| Callard, John Case, | Winthrop, | 40 Amity Street. |
| Cande, Donald Hopkins, | Pittsfield, | 83 Pleasant Street. |
| Chase, Alexander Baxter, Jr., | West Barnstable, | 13 Fearing Street. |
| Churchill, Chester Albert, | Brockton, | Angus's Cottage. |
| Clare, Frederick Henry, | Mattapan, | – – |
| Clark, Arthur Lincoln, | Jamaica Plain, | 35 East Pleasant Street. |
| Clark, Ellis Fred, | Granby, Conn,, | Theta Chi House. |
| Clark, George Henry,[1] | Sherborn, | 3 Nutting Avenue. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Clark, Saxon Dickinson, | Springfield, | 120 Pleasant Street. |
| Clough, Maurice Joseph, | Swampscott, | 30 North Prospect Street. |
| Cohen, Samuel Adams, | Roxbury, | 101 Pleasant Street. |
| Dalrymple, Andrew Campbell, | Revere, | 3 McClellan Street. |
| Damon, Leon Blanchard, | Melrose, | 31 North Prospect Street. |
| Darling, Homer Chester,[1] | Mendon, | 15 Hallock Street. |
| Day, George Allen, | Warren, | 12 Cottage Street. |
| Dole, Sumner Alvord, | Bardwell's Ferry, | Walker Hall. |
| Donnell, George Edwin, | Burlington, | 10 Tyler Place. |
| Doran, William Leonard, | North Dartmouth, | 35 East Pleasant Street. |
| Draper, Earle Sumner, | Milford, | C. S. C. House. |
| Eaton, Paul Baker, | Wakefield, | 83 Pleasant Street. |
| Estes, Ralph Carey, | Lancaster, | 79 Pleasant Street. |
| Fairbank, Harvey Nathan, | Sudbury, | Care of E. F. Gaskill. |
| Fales, Gerald, | Worcester, | 75 Pleasant Street. |
| Farrar, Stuart Kittridge, | Springfield, | Kappa Sigma House. |
| Fisher, Leonard Cyrus,[1] | Norwood, | 35 East Pleasant Street. |
| Fitzgerald, Daniel James,[1] | Worcester, | 75 Pleasant Street. |
| Flebut, Alpha John, | Amherst, | 27 McClellan Street. |
| Fox, Everett Bailey, | Dracut, | East Experiment Station. |
| Gare, Edward John, | Northampton, | 13 Phillips Street. |
| Gibbs, Robert Burley, | Ballston Spa, N. Y., | 3 Nutting Avenue. |
| Goodwin, Malcolm Noyes, | Newburyport, | 66 Pleasant Street. |
| Grant, Harold Davidson, | Melrose, | 3 McClellan Street. |
| Griggs, Raymond Bradford, | Chicopee Falls, | 84 Pleasant Street. |
| Hager, Clayton Marden, | Somerville, | 9 Nutting Avenue. |
| Hall, George Morris, | Brookline, | Lincoln Block. |
| Hall, Roderick Chesley, | Worcester, | 29 Pleasant Street. |
| Harper, James Edward, | New Haven, Conn., | 29 Lincoln Avenue. |
| Harper, Raymond Wires, | Barre, | Hatch Experiment Barn. |
| Harvey, Russell Wilton, | Lanesville, | 44 Pleasant Street. |
| Haskell, Willis Henry, Jr., | Brooklyn, N. Y., | 15 Beston Street. |
| Haskins, Leroy Everett, | Taunton, | 120 Pleasant Street. |
| Hatfield, William Hollis, | Wellesley, | 30 North Prospect Street. |
| Hathaway, Isaac, | Kingston, | Care of E. F. Gaskill. |
| Haug, Chester Amos, | New York, N. Y., | 15 Fearing Street. |
| Hawes, Clayton Prescott, | North Dartmouth, | 35 East Pleasant Street. |
| Heartz, Forrest Oscar, | Melrose Highlands, | 35 Amity Street. |
| Hildreth, Paul Hughes, | Newtonville, | 8 Allen Street. |
| Hill, Charles Chase, | Melrose Higlhands, | Pease Avenue. |
| Hotis, Ralph P., | Evans Mills, N. Y., | 52 Amity Street. |
| Houghton, Arthur Reginald, | South Lancaster, | C. S. C. House. |
| Hyde, George Frederick, | North Dana, | 79 Pleasant Street. |
| Hyde, Harold Gilmore, | Winchendon, | 29 North Prospect Street. |
| Jackson, John Carleton, | Sherborn, | 15 Hallock Street. |
| Johnson, Arthur, | Bridgeport, Conn., | Brooks Farm. |
| Johnson, Bernard Pol, | New York, N. Y., | College Store, North College. |
| Jordan, Perley Balch, | Topsfield, | 31 North Prospect Street. |
| Joubert, Sylvester Gordon, | Middletown, Conn., | 31 Lincoln Avenue. |
| Kane, Paul Vincent, | Worcester, | Brooks Farm. |
| Karnan, Parker Robert, | Hyde Park, | 31 Lincoln Avenue. |
| Kelliher, Jerome Joseph, | Montague City, | 75 Pleasant Street. |
| Kennedy, Thomas James, | South Hadley Falls, | Brooks Farm. |
| Kilbon, Ralph Gillette,[1] | Springfield, | 19 Pleasant Street. |
| Komp, William H. Wood,[1] | Rutherford, N. J., | 82 Pleasant Street. |
| Koplovitz, Samuel, | Chelsea, | 112 Pleasant Street. |
| Lane, Merton Chesleigh, | South Duxbury, | Pleasant Street, care of Mr. Root. |
| LeDuc, Ashley Cudworth, | Chesterfield, | 13 Hallock Street. |
| Lewis, Daniel James, | Hanson, | 120 Pleasant Street. |
| Lewis, John Kirby, | New Haven, Conn., | 52 Lincoln Avenue. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Lincoln, Irving Bowin,[1] | Glens Falls, N. Y., | 55 Pleasant Street. |
| Little, Harold Greenleaf, | Newburyport, | 66 Pleasant Street. |
| Lovejoy, John Sumner, | Newburyport, | 12 Cottage Street. |
| MacDonald, Norman Duncan,[1] | Melrose, | 47 Pleasant Street. |
| MacNeil, Ralph Langdell, | Chelsea, | 52 Amity Street. |
| Macy, Philip Arthur, | Oak Bluffs, | 12 Cottage Street. |
| Mahan, Harold Butterworth, | Boston, | 13 Phillips Street. |
| Marsh, Franklin Winter, | Amherst, | 9 Woodside Avenue. |
| Marsh, Herbert Verner, | Greenfield, | 79 Pleasant Street. |
| Masse, Sidney Merton, | Dorchester, | 3 McClellan Street. |
| McKechnie, Ray Farrar,[1] | Natick, | 5 McClellan Street. |
| McLain, Ralph Emerson, | Melrose, | 10 Allen Street. |
| Melican, George Deady,[1] | Worcester, | 66 Pleasant Street. |
| Moberg, Carl David, | Campello, | 5 McClellan Street. |
| Moberg, Eldon Samuel, | Campello, | 5 McClellan Street. |
| Montague, Enos James, | Northampton, | Nutting Avenue, care of Mr. Plumb. |
| Moore, Elbert Francis,[1] | Waltham, | 81 Pleasant Street. |
| Moore, Roger Henry, | Beverly, | 79 Pleasant Street. |
| Munger, George Draper, | Worcester, | – – |
| Murray, John Kean, | Winthrop, | Mt. Pleasant, care of Mr. Greene. |
| Navas, Miguel, | New York, | 56 Pleasant Street. |
| Norton, Chester Harold, | Chelsea, | 2 Allen Street. |
| Parmenter, Ernest Brigham, | Dover, | 79 Pleasant Street. |
| Patten, Merrill Campbell, | Brighton, | 52 Lincoln Avenue. |
| Patterson, Robert Earley, | Dorchester, | 9 Woodside Avenue. |
| Pendleton, Harlow Libby, | Dorchester, | 31 North Prospect Street. |
| Perkins, Olney Hilton,[1] | Brockton, | 55 Pleasant Street. |
| Perry, Gerald Eugene, | Amherst, | 17 Amity Street. |
| Phillips, Ralph Edward, | Mendon, | 15 Hallock Street. |
| Pike, Joseph Stevens, Jr., | Somerville, | 3 Nutting Avenue. |
| Poole, Joseph Ellsworth, | Needham, | – – |
| Po, Shue Lo, | Canton, China, | 31 Lincoln Avenue. |
| Potter, George Raymond, | Ludlow, | 1 Allen Street. |
| Price, James Albert, | New York, N. Y., | 15 Beston Street. |
| Prouty, Langdon, | Littleton, | 35 East Pleasant Street. |
| Quincy, Knight, | Roslindale, | 35 East Pleasant Street. |
| Ray, George Burrill, | Hingham, | Brooks Farm. |
| Rendall, Raymond Eaton, | Melrose, | Lincoln Avenue and Amit Street. |
| Rhoades, Paul Whitney, | Malden, | 2 Allen Street. |
| Rogers, Harold Merriman, | Southington, Conn., | Mt. Pleasant, care of Professor Sears. |
| Saben, Maxwell Boehm, | Newport, R. I., | 83 Pleasant Street. |
| Sauchelli, Vincent,[1] | Waterbury, Conn., | 11 High Street. |
| Sauter, John Martin, | Turners Falls, | 75 Pleasant Street. |
| Scott, Lincoln Bain, | Melrose, | 3 McClellan Street. |
| Sears, William Richardson, | Arlington, | 31 East Pleasant Street. |
| Severance, Verne Lincoln, | South Hanson, | Pleasant Street, care of Mr. Root. |
| Seton, George Patrick, | Darien, Conn., | 31 East Pleasant Street. |
| Shaylor, Fred Wright,[1] | Lee, | Kappa Sigma House. |
| Sherman, Milton Francis, | South Lincoln, | Dickinson House. |
| Simon, Isaac Barney, | Revere, | Brooks Farm. |
| Smith, Francis Albert,[1] | West Newton, | 29 McClellan Street. |
| Smith, Philip Lawrence,[1] | Kingston, | East Experiment Station. |
| Spofford, Chester Porter, | South Groveland, | 66 Pleasant Street. |
| Strauss, Abraham,[1] | Boston, | 101 Pleasant Street. |
| Taft, Richard Craig, | Oxford, | 88 Pleasant Street. |
| Tarr, Lester Winslow, | Rockport, | 44 Pleasant Street. |
| Thayer, Granville Martyn, | South Hanson, | 15 Beston Street. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Tonry, Albert Joseph, | Winthrop, | 17 South College. |
| Tower, William Reginald, | Sheffield, | 120 Pleasant Street. |
| Tower, Ralph Ernest, | Becket, | Brooks Farm. |
| Towne, Edwin Chester, | Waltham, | 19 Pleasant Street. |
| Upton, Raymond Melville, | Peabody, | 19 Hallock Street. |
| Vinal, Stuart Cunningham, | East Weymouth, | 8 Allen Street. |
| Warner, Lewis Pomeroy,[1] | Sunderland, | 13 Phillips Street. |
| Weed, Frank Hammond,[1] | Great Neck, L. I., | 83 Pleasant Street. |
| Wellington, Benjamin, | Waltham, | Care of E. F. Gaskill. |
| White, Homer Beethoven, | Melrose, | 35 South Pleasant Street. |
| White, Harry Dexter, | Boston, | 56 Pleasant Street. |
| White, Henry Harrison, | West Peabody, | 79 Pleasant Street. |
| Whitmore, Philip Ferry, | Sunderland, | 13 Phillips Street. |
| Whorf, Paul Francis, | Forest Hills, | 87 Pleasant Street. |
| Wilkins, Alfred Emerson, | Wakefield, | 83 Pleasant Street. |
| Willey, Harold Cleland Clancey,[1] | Orange, | 101 Pleasant Street. |
| Williams, Donald,[1] | Catasauqua, Pa., | C. S. C. House. |
| Williams, Henry Chester,[1] | Topsfield, | 21 McClellan Street. |
| Wright, Elvin Stanley, | Worcester, | 15 Fearing Street. |

### UNCLASSIFIED STUDENTS.

| | | |
|---|---|---|
| Chambers, Maude Burdick, | Harpers Ferry, W. Va., | 3 Fearing Street. |
| Chow, Tse Ki, | Canton, China, | Care of Professor White. |
| Chu, Alfred Wen, | Tientsin, China, | 90 Pleasant Street. |
| Crosby, Stanley, | Warren, | Theta Delta Chi House. |
| Dearth, Newman, | Ashland, | 86 Pleasant Street. |
| Fisher, Earl Jarvis, | Falmouth, | 23 Pleasant Street. |
| Fuller, Richard, | Salem, | 6 Nutting Avenue. |
| Goodnow, Edna Minnie, | Amherst, | 15 Spring Street. |
| Hart, Edward Haskell, | Falmouth, | 86 Pleasant Street. |
| Howe, James Sullivan, Jr., | Brookline, | Prospect House. |
| Kaulback, Hugh Arms, | Greenfield, | Care of Professor Gaskill. |
| Kennedy, Worthington Chester, | Hardwick, | 15 Hallock Street. |
| Liang, Foo Tso, | Canton, China, | 90 Pleasant Street. |
| Mott, Percival, | Nashua, N. H., | 81 Pleasant Street. |
| Moyle, John, Jr., | Groton, | 77 Pleasant Street. |
| Nash, Henry Clark, Jr., | Amherst, | 67 Pleasant Street. |
| Noble, Howard Ermy, | Tyngsborough, | "Lovers Lane." |
| O'Brien, Daniel William, | Wayland, | Brooks Farm. |
| Pease, Willard Noah M., | Altoona, Pa., | North Amherst. |
| Phelps, Benjamin Austin, | Northampton, | 8 Allen Street. |
| Prouty, LeRoy Fletcher, | Rockland, | 15 Hallock Street. |
| Rae, George Little, | Needham Heights, | 3 Nutting Avenue. |
| Ray, Frederick Almar, | Hyde Park, | 116 Pleasant Street. |
| Richards, Edwin Henry, | Hartford, Conn., | 2 Allen Street. |
| Selkregg, Edwin Reimund, | Amherst, | 12 Cottage Street. |
| Stanford, Ernest Elwood, | Rowe, | 71 South Pleasant Street. |
| Taplin, Warren Hartt, | Colorado Springs, Col., | 13 Hallock Street. |
| Trider, George Henry, | Waltham, | 19 Pleasant Street. |
| Wright, George Ellery, | Brockton, | 29 North Prospect Street. |

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[1] Work incomplete.

### Summary by Classes.

| | |
|---|---|
| Graduate students, | 17 |
| Senior class, | 85 |
| Junior class, | 97 |
| Sophomore class, | 127 |
| Freshman class, | 169 |
| Unclassified students, | 29 |
| Total, | 524 |

### Geographical Summary.

| | |
|---|---|
| Massachusetts, | 443 |
| New York, | 25 |
| Connecticut, | 20 |
| New Hampshire, | 6 |
| New Jersey, | 5 |
| Pennsylvania, | 4 |
| Rhode Island, | 4 |
| Vermont, | 2 |
| Colorado, | 1 |
| Delaware, | 1 |
| Georgia, | 1 |
| Virginia, | 1 |
| West Virginia, | 1 |
| Iowa, | 1 |
| Maine, | 1 |
| China, | 7 |
| Scotland, | 1 |
| Total, | 524 |

### Graduate Students — Candidates for a Degree.

Allen, Rodolphus Harold, . . . . . . . . . . Fall River.
B.Sc., Massachusetts Agricultural College, 1910.
Anderson, David Wadsworth, . . . . . . . . . . Manchester, N. H.
B.Sc., New Hampshire State College, 1910.
Bartlett, Oscar Christopher, . . . . . . . . . . Westhampton.
B.Sc., Massachusetts Agricultural College, 1909.
Bourne, Arthur Israel, . . . . . . . . . . Amherst.
A.B., Dartmouth College, 1907.
Crossman, Samuel Sutton, . . . . . . . . . . Needham.
B.Sc., Massachusetts Agricultural College, 1909.
Holland, Edward B., . . . . . . . . . . Amherst.
B.Sc., Massachusetts Agricultural College, 1892; M.Sc., Massachusetts Agricultural College, 1898.
Hourdequin, Leon Remy, . . . . . . . . . . Brooklyn, N. Y.
A.B., Williams College, 1911.
McLaine, Leonard Septimus, . . . . . . . . . . New York, N. Y.
B.Sc., Massachusetts Agricultural College, 1910.
Merrill, Joseph Henry, . . . . . . . . . . Danvers.
B.Sc., Dartmouth College, 1905.

| | |
|---|---|
| Smulyan, Marcus Thomas,<br>B.Sc., Massachusetts Agricultural College, 1909. | Amherst. |
| Thomas, Frank Lincoln,<br>B.Sc., Massachusetts Agricultural College, 1910. | Athol. |
| Thompson, Edward Joseph,<br>B.Sc., Harvard College, 1911. | Cambridge. |
| Watkins, John Bedford,<br>B.Sc., Virginia Polytechnic, 1911. | Midlouthian, Va. |
| Regan, William Swift,<br>B.Sc., Massachusetts Agricultural College, 1908. | Northampton. |

### GRADUATE STUDENTS — NOT CANDIDATES FOR A DEGREE.

| | |
|---|---|
| Adams, Harold Stanard,<br>A.B., Williams College, 1911. | Pittsfield. |
| Butler, Aubrey Bickford,<br>A.B., Dartmouth College, 1911. | Chelsea. |
| Crocker, Bartow,<br>B.Sc., Harvard College, 1911. | Cambridge. |

# ADDENDUM.

# ADDENDUM.

## MAJORS.

### GENERAL STATEMENT.

Beginning with September, 1912, a plan of major courses will become operative for members of the junior and senior classes. A major will consist of 30 hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their department. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

### CLASS OF 1913.

Since it will not be possible for the class of 1913 to conform fully with the regulations concerning majors given above, the following regulations will apply to them in making their elections: —

As stated below, the minimum semester credits will be 15 hours, the maximum 21 hours, and the members of the class of 1913 will fill out their elective cards with these facts in mind. For the class of 1913 the required work after the sophomore year is to be counted as follows: —

5 credits in the junior year in Military Science and Physical Education.
3 credits in Economics 1.
3 credits in English; other subjects in the Humanities, or Rural Social Science.

Each member of 1913 must obtain on June 5, from the registrar, an elective card to be filled out with his election of courses for the senior year.

Members of 1913 must from the list given below choose any instructor as his adviser. After the card has been filled out for both semesters of the senior year, and has received the approval of the adviser, it must be returned to the registrar's office on or before June 15.

## RULES.

RULE 1. *Election.* — Each student, in the second semester of his sophomore year, shall elect a major subject from the list of majors given below; and this major shall consist of 30 credit hours of correlated work.

RULE 2. *Minimum Credits.* — The minimum number of credits for the junior and senior years shall be 65, inclusive of Military Drill and Physical Education.

RULE 3. *Maximum Credits.* — The maximum number of credits for any semester of the junior or senior year shall be 21.

RULE 4. *Humanities and Rural Social Science.* — A minimum of 15 credit hours in the Divisions of the Humanities and of Rural Social Science shall be required of all students during their junior and senior years, with the following restriction: that a minimum of 3 credit hours will be required in each of the divisions.

RULE 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 30 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

RULE 6. *Free Electives.* — Each student is required to take 30 hours in his major and 15 hours in the Divisions of the Humanities and of Rural Social Science, making a total of 45 hours. He is allowed free choice for the remaining part of his required hours, this remainder amounting to 15 hours minimum for the two years, or 35 hours maximum.

RULE 7. *Registration.* — No upper classman shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office on June 5.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the year and will countersign the same.

(3) Each course card must be filled out, giving the name of student, with his college address, also the name of parent or guardian,

with the home address. When the elections have been entered on this card, and the balance of hours added by the student, the card must be returned to the registrar not later than June 15.

RULE 8. *Changes.* — Applications for changes may be made to the dean in writing at any time, and, when approved by him and by the committee on scholarship, become operative at the beginning of the semester following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

## LIST OF MAJORS.

### Agriculture.

Prof. JAMES A. FOORD, Adviser.

| Course. | Credit. |
|---|---|
| Agronomy 3, | 3 |
| Agronomy 6, | 3 |
| Animal Husbandry 5, | 3 |
| Animal Husbandry 6, | 1 |
| Animal Husbandry 9, | 3 |
| Dairying 1, | 3 |
| Dairying 2, | 3 |
| Farm Administration 3, | 3 |
| Farm Administration 4, | 3 |
| Chemistry 7, | 3 |
| Veterinary Science 1, | 3 |
| | 31 |

### Agronomy.

Assistant Prof. SIDNEY B. HASKELL, Adviser.

| Course. | Credit. |
|---|---|
| Agronomy 3, | 3 |
| Agronomy 4, | 3 |
| Agronomy 5, | 3 |
| Agronomy 6, | 3 |
| Agronomy 8, | 3 |
| Animal Husbandry 5, | 3 |
| Animal Husbandry 9, | 3 |
| Farm Administration 4, | 3 |
| Chemistry 7, | 3 |
| Chemistry 8, | 3 |
| | 30 |

### Animal Husbandry.

Associate Prof. J. Allan McLean, Adviser.

| Course. | Credit. |
|---|---|
| Agronomy 3, | 3 |
| Animal Husbandry 5, | 3 |
| Animal Husbandry 6, | 1 |
| Animal Husbandry 8, | 2 |
| Animal Husbandry 9, | 3 |
| Animal Husbandry 10, | 3 |
| Animal Husbandry 11, | 2 |
| Dairying 1, | 3 |
| Farm Administration 3, | 3 |
| Farm Administration 4, | 3 |
| Veterinary Science 3, | 3 |
| | 29 |

### Dairying.

Associate Prof. William P. B. Lockwood, Adviser.

| Course. | Credit. |
|---|---|
| Animal Husbandry 5, | 3 |
| Animal Husbandry 6, | 1 |
| Animal Husbandry 8, | 2 |
| Animal Husbandry 9, | 3 |
| Animal Husbandry 11, | 2 |
| Dairying 1, | 3 |
| Dairying 2, | 3 |
| Dairying 3, | 3 |
| Dairying 4, | 3 |
| Farm Administration 3, | 3 |
| Farm Administration 4, | 3 |
| | 29 |

### Poultry Husbandry.

Associate Prof. John C. Graham, Adviser.

| Course. | Credit. |
|---|---|
| Poultry Husbandry 1, | 2 |
| Poultry Husbandry 2, | 2 |
| Poultry Husbandry 3, | 1 |
| Poultry Husbandry 4, | 1-3 |
| Poultry Husbandry 5, | 1 |
| Poultry Husbandry 6, | 3 |
| Poultry Husbandry 7, | 3 |
| Poultry Husbandry 9, | 3 |
| Pomology 1, | 3 |
| Agronomy 3, | 3 |
| Animal Husbandry 5, | 3 |
| Animal Husbandry 9, | 3 |
| Veterinary Science 1, | 3 |
| | 31 |

## General Horticulture.

Prof. Frank A. Waugh, Adviser.

This major will consist of courses selected from the Departments of Pomology, Floriculture, Market Gardening, Landscape Gardening and Forestry, to suit the particular needs of the student. In special cases, courses from the Department of Agronomy will also be counted toward the major in general horticulture.

## Floriculture.

Prof. Edward A. White, Adviser.

| Course. | Credit. |
|---|---|
| Floriculture 1, | 4 |
| Floriculture 2, | 4 |
| Floriculture 3, | 3 |
| Floriculture 4, | 3 |
| Horticulture 3, | 3 |
| Horticulture 4, | 3 |
| Entomology 1, | 3 |
| Market Gardening 2, | 3 |
| Botany 2, | 4 |
| | 30 |

*Note.* — Horticulture 3 and 4 is a junior subject, but to balance the work for the two years it would be better for the floricultural students to take the course in the senior year.

## Forestry.

Associate Prof. Frank F. Moon, Adviser.

| Course. | Credit. |
|---|---|
| Forestry 1, | 3 |
| Forestry 2, | 3 |
| Forestry 3, | 3 |
| Forestry 4, | 3 |
| Forestry 5, | 2 |
| Forestry 6, | 2 |
| Entomology 5, | 3 |
| Horticulture 3, | 3 |
| Horticulture 4, | 3 |
| Botany 13, | 4 |
| | 29 |

### Landscape Gardening.

Prof. Frank A. Waugh, Adviser.

| Course. | Credit. |
|---|---|
| Landscape Gardening 1, | 3 |
| Landscape Gardening 2, | 3 |
| Landscape Gardening 3, | 3 |
| Landscape Gardening 4, | 3 |
| Landscape Gardening 5, | 2 |
| Landscape Gardening 6, | 2 |
| Landscape Gardening 7, | 3 |
| Landscape Gardening 8, | 3 |
| Drawing 1, | 3 |
| Drawing 2, | 3 |
| Horticulture 3, | 3 |
| | 31 |

Landscape Gardening 6 will probably be given quite differently in alternate years, and thus should be open to *both* juniors and seniors.

Courses for juniors *only*: Landscape Gardening, 1, 2, Drawing, 1 and 2.

Courses for seniors and graduates *only*: Landscape Gardening, 7 and 8.

Courses open to juniors and seniors, both if possible: Horticulture 3 and 4 and possibly Landscape Gardening 3 and 4.

This grouping of subjects is offered only as an example. Other groupings may be approved by the adviser, but such other groupings must be subject to the class schedule.

### Pomology.

Prof. Fred C. Sears, Adviser.

| Course. | Credit. |
|---|---|
| Pomology 1, | 3 |
| Pomology 2, | 3 |
| Pomology 3, | 3 |
| Pomology 4, | 3 |
| Botany 5, | 2 |
| Botany 7, | 5 |
| Agronomy 6, | 3 |
| Farm Administration 3, | 3 |
| Farm Administration 4, | 3 |
| Entomology 1, | 3 |
| | 31 |

### Agricultural Chemistry.

Assistant Prof. Charles A. Peters, Adviser.

| Course. | Credit. |
|---|---|
| Chemistry 5, | 5 |
| Chemistry 6, | 5 |
| Chemistry 9, | 5 |
| Chemistry 10, | 5 |
| Chemistry 11, | 5 |
| Chemistry 12, 14 or 16, | 5 |
| Chemistry 13, | 3 |
| Chemistry 15, | 3 |
| Chemistry 18, | 2 |
| | 38 |

The major will consist of 30 credit hours selected from this list. The student will be advised concerning other subjects suited to be taken in connection with Chemistry.

### Economic Entomology.

Prof. Henry T. Fernald, Adviser.

| Course. | Credit. |
|---|---|
| Entomology 1, | 3 |
| Entomology 2, | 2 |
| Entomology 3, | 4 |
| Entomology 4, | 4 |
| Entomology 5, | 3 |
| Entomology 8, | 3 |
| Botany 3, | 4 |
| Botany 4, | 2 |
| Zoölogy 3, | 3 |
| Zoölogy 4, | 3 |
| | 31 |

A major in Economic Entomology does not necessarily include all the entomological subjects, as implied at the top of this list.

### Plant Physiology and Pathology.

Prof. George E. Stone, Adviser.

| Course. | Credit. |
|---|---|
| Botany 3, | 4 |
| Botany 4, | 2 |
| Botany, 10, | 4 or 5 |
| Botany 14, | 4 |
| Chemistry 5, | 5 |
| Chemistry 6, | 5 |
| Entomology 1, | 3 |
| Entomology 2, | 2 |
| | 29 or 30 |

### Agricultural Education.

Prof. William R. Hart, Adviser.

| Course. | Credit. |
|---|---|
| Agricultural Education 1, | 3 |
| Agricultural Education 2, | 3 |
| Agricultural Education 3, | 2 |
| Agricultural Education 4, | 3 |
| Dairying 5, | 2 |
| Farm Administration 3, | 3 |
| Floriculture 1, | 4 |
| Poultry Husbandry 1, | 2 |
| Poultry Husbandry 2, | 2 |
| Market Gardening 2, or Agronomy 3, | 3 |
| Botany 5, | 2 |
| | 29 |

A minimum of 15 credit hours should be elected by the student from the group of subjects offered by the Divisions of the Humanities and of Rural Social Science. Not less than 3 credit hours must be taken in each division.

| ELECTIVE COURSES OFFERED IN DIVISION OF HUMANITIES. | | | | ELECTIVE COURSES OFFERED IN DIVISION OF RURAL SOCIAL SCIENCE. | | |
|---|---|---|---|---|---|---|
| Economics and Sociology | History and Government | English | Modern Languages | Agricultural Economics | Agricultural Education | Rural Sociology |
| 1 Elementary Economics | 1 Elements of Political Science | 7 Expository Writing | 7 Scientific French<br>11 German Literature | | 1 Meaning of Education | 3 Literature of Rural Life |
| 3 Social Institutions and Social Problems | 3 History of New England | 9a. Introductory Rural Journalism (2 hrs.)<br>9b. Journalistic Prac. (2 hrs.)<br>9c. Adv. Journalistic Practice (1 hr.) (Ind.) | 9 French Literature | 7 Problems in Agr. Econ. (2 hrs. Ind.) | 3 Methods (2 hrs. Ind.) | 7 Rural Institutions |
| 5 Public Finance, Money, Banking | 5 History of Ideals | 13 English Writers and Thought | 1 Elementary Spanish | 9 Seminar (Ind.) | 5 Seminar (Ind.) | 5 Social Conditions of Rural People |
| | | 15 English Language and Literature | 9 Scientific German | 5 Historical and Comparative Agr. | | 9 Social Psychology of Rural Life |
| | | P. S. 9 Debating (Ind.) (2 hrs.) | 7 Modern German | | | 11 Soc. Aspects of Current Agric. Quest. |
| | | 17 Adv. Comp. and Literature (2 hrs.) | | | | |
| | | | 1 History of Music (Ind. evening) | | | 13 Seminar |
| 2 Industrial Problems | 2 Local Political Institutions | 8 Expository Writing (technical) | 8 Scientific French | | 2 Vocational Educ. | 4 Rural Law (Ind.) |
| 4 Mod. Soc. Ref. Movements | | 10a. Reporting and News Writing (2 hrs.)<br>10b. Jour. Prac. (2 hrs.)<br>10c. Adv. Jour. Prac. (1 hr.) (Ind.) | 10 French Literature | 5 Co-operation in Agr. (2 hrs. Ind.) | 4 Teachers' Agric. | 6 Soc. Aspects of Co-op. among Farmers |
| 6 Economic History | | 14 English Writers and Thought | 2 Modern Spanish Authors | 10 Seminar (Ind.) | 6 Seminar (Ind.) | 8 The State and the Farmer. |
| 8 Anthropology | | 16 English Language and Literature | 10 Scientific German | 4 Elements of Agric. Economics | | 10 Farmers' Organizations |
| | | 18 Advanced Literature | 8 Modern German | | | 2 Rural Community |
| | | P. S. 8 Occasional Oratory | 2 History of Music (Ind.) | | | |

Ind. hours may be arranged independent of schedule.

## SUMMARY.

There are four preliminary steps which a student should take in arranging for his major work.

1. Select a major.

2. Confer with major adviser for arrangement of courses, the plan to be approved by adviser in accordance with Rule 5 previously stated.

3. Select courses covering the four semesters of the junior and senior years in such a way that a minimum of 15 credits will be taken in the Divisions of Humanities and of Rural Social Science; the distribution of all but 3 of these credits may be decided by the student.

4. Choose other courses so that the total number of credits for any semester shall be not less than 16 or more than 21. (See Rules 2 and 3.)

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Public Document No. 31

# FIFTIETH ANNUAL REPORT

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE.

## PART I.

REPORT OF THE PRESIDENT AND OTHER OFFICERS
FOR FISCAL YEAR ENDED NOV. 30, 1912.

FEBRUARY, 1913.

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# The Commonwealth of Massachusetts.

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MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, Dec. 2, 1912.

To His Excellency EUGENE N. FOSS.

SIR: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part I. of the fiftieth annual report of the trustees, for the fiscal year ended Nov. 30, 1912, this being the report to the corporation of the president and other officers of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
*President.*

# REPORT OF THE PRESIDENT OF THE COLLEGE.

*Gentlemen of the Corporation.*

I herewith submit my annual report as president of the Massachusetts Agricultural College.

Each administrative officer has been asked to present a résumé of the year's work coming under his jurisdiction, and this material has been freely utilized in the present report. Following the precedent of a year ago, the report divides itself into three fairly distinct portions: —

1. A Review of the Year (page 5).
2. A Statement of Immediate Needs (page 23).
3. The Relation of the College to the Organization of Massachusetts Agriculture and Country Life (page 28).

These discussions are followed by the usual data concerning students, etc., and by the annual report of the treasurer of the institution.

## A REVIEW OF THE YEAR.

### Attendance.

The attendance of students enrolled in the four years' course at this date is 502, an increase of 25 over the enrollment of a year ago. In addition to this enrollment there are 22 members of the graduate school, and 31 students registered in college classes as "unclassified" students. Therefore, the total number of students doing work of college grade is 555, an increase of 34 over the total enrollment of last year. The entering class this fall numbered 184, a small increase over the number entering last year. (See Table I.)

Nearly 86 per cent. of those entering this year come from Massachusetts, and 8 other States are represented. The proportion of non-residents does not seem to have decreased, although the rule requiring a tuition fee from such students is now in force.

Every county in Massachusetts, with the exception of Nantucket, is represented in the present freshman class, Middlesex County sending the largest number, which is 34, or nearly 22 per cent., of the total number entering. (See Table V.)

One-fifth of the class are undecided as to their intended vocation; over one-third of the entire class express their intention of following some line of professional agriculture or horticulture as their life work, and about two-fifths more signify their intention of entering some vocation in practical agriculture or horticulture; nearly 94 per cent. of those having made a decision, therefore, intend to follow an agricultural vocation. Twenty-six per cent. of the fathers of the members of the freshman class are engaged in agriculture or horticulture, and about the same per cent. are business men. Approximately one-third of the class come from farms, and two-fifths have had no farm experience whatever. The average age of the entering class is 19.22 years. All of these statistics show practically the same results as those compiled for the class entering one year ago. (See Table V.)

## Appropriations.

The trustees presented to the Legislature of 1912 requests for special appropriations amounting to approximately $386,000, the principal items in the list being an agricultural building, a students' dormitory, an addition to French Hall, and an addition to Draper Hall; of this amount $80,000 was granted, providing for the addition to Draper Hall, sewers, repairs, improvements and equipment. An increase of $109,000 in current annual appropriations was asked, and a large portion of it was granted, making the total annual income from the State $250,000. (See Table II.)

## Construction and Repairs.

Six buildings have been completed during the past year, namely, the dairy building (Flint Laboratory), completed about the middle of August at a cost of $75,000, the apiary, completed in June at a cost of $3,000, and four much-needed buildings for the poultry department.

There have been numerous repairs and improvements during the year, probably the most noticeable of which is the painting of many of the college buildings, in colors recommended by our consulting architect. For example, several of the frame buildings have been painted a colonial gray, trimmed with "M. A. C. white."

One of the most needed improvements has been the building of the extension to the dining hall. This change is not quite completed. The addition provides a fine separate lunch room, and also increases the seating capacity of the main dining hall by 120. The maximum capacity of the dining quarters is now not far from 800.

Other improvements have been the remodeling of the offices of the treasurer in south college, the refitting of the laboratory on the third floor of the chemical building, the fitting up of a new bacteriological room in the basement of the veterinary building, the enlargement of the agronomy laboratory in south college; also an extension to the power plant which was very much needed and which gives the necessary room for storage for general supplies. There have also been many minor repairs and improvements.

## COMMENCEMENT.

The annual commencement occurred June 19. At that time the degree of Bachelor of Science was conferred on 83 men, thus making the class about a third larger than any class previously graduating. The college also conferred the degree of Master of Science on one candidate, and the degree of Doctor of Philosophy on one. Hon. Charles W. Garfield of Grand Rapids, Mich., delivered the commencement address on "The Business Conscience." The Lieutenant-Governor, Hon. Robert Luce, was present as the representative of the Commonwealth. The attendance at the alumni dinner was 230.

## SUMMER CONFERENCE.

The summer school of 1912 was omitted. There was held, however, the third annual "Conference for Rural Leaders," the enrollment at which was 184. In this connection there was for the second year a large and interesting exhibit of rural social work, illustrating various forms of the service which is being undertaken for the betterment of rural communities.

The conference this year was not only very satisfactory in its program and in the attendance, but it was particularly notable by reason of the fact that it was the result of the co-operation of a number of different institutions and agencies interested in country life, the college serving chiefly as a clearing-house by which these institutions participated in the program. The following organizations co-operated with the college and were officially represented: Federation of Churches of Massachusetts; State Board of Education; Free Public Library Commission; Massachusetts Civic League; State Board of Health; County Work of Y. M. C. A.; County Work of Y. W. C. A.; New England Home Economics Association; the Russell Sage Foundation; the Massachusetts Board of Home Missions; Smith's Agricultural School; American Civic Association; New York Child Welfare Exhibit; Massachusetts Society for Prevention of Cruelty to Children.

## The Winter School.

The attendance at the winter school of 1912 was 131, this number being slightly larger than that of the previous year. The poultry course, which was given during the last two weeks of the winter school, brought an additional number of persons to the college. At the close of the winter school the annual farmers' week was held; over a thousand people registered during these three days of instruction.

## Visits of Outside Associations.

During the year numerous associations, not officially identified with the institution, have held meetings at the college; the following is a list, doubtless incomplete, of such meetings: —

| | | |
|---|---|---|
| February | 7, 8. | Apiary Inspectors of Northeastern United States and Canada. |
| March | 5. | Tenth District Massachusetts State Poultry Association. |
| March | 10. | Connecticut Valley Breeders' Association. |
| March | 13. | Massachusetts Dairymen's Association. |
| March | 15. | Massachusetts Sheep Breeders' Association. |
| June | 13. | Hampshire, Hampden and Franklin Beekeepers' Association. |
| June | 26, 27. | Library Institute (Auspices of Free Public Library Commission). |
| October | 14. | Hampshire, Hampden and Franklin Beekeepers' Association. |

## The Major System.

At the beginning of the current college year a system of major subjects became effective. This is an arrangement whereby at the close of the sophomore year each student is required to elect a specific subject in one of those departments offering work organized as a major. During the junior and senior years the student is required to take a minimum of thirty hours' work in his major subject, a minimum of fifteen hours in the divisions of the humanities and rural social science, and a minimum of fifteen hours additional which may be elected at will by the student.

Each student is under the supervision of a major adviser, who ordinarily is the head of the department offering the major course.

At present the following subjects are open as major courses; the titles of the major courses, and the number of juniors electing each major, are indicated in the table (obviously, the major system is not yet in complete operation, owing to the fact that members of the present senior class were unable to elect a major in the prescribed manner): —

| | |
|---|---|
| Agriculture, | 11 |
| Agronomy, | 2 |
| Animal husbandry, | 11 |
| Dairying, | 2 |
| Poultry husbandry, | 3 |
| General horticulture, | 4 |
| Floriculture, | 5 |
| Forestry, | – |
| Landscape gardening, | 18 |
| Pomology, | 25 |
| Agricultural chemistry, | 11 |
| Economic entomology, | 6 |
| Plant physiology and pathology, | 1 |
| Agricultural education, | 3 |
| Total, | 102 |

## New Appointments.

The following appointments to major positions on the teaching and extension service staff have been made by the trustees during the year: —

Charles E. Marshall was elected director of the graduate school and professor of microbiology. Dr. Marshall comes from the Michigan Agricultural College, where for many years he has been head of the department of bacteriology. Dr. Marshall was trained chiefly at the University of Michigan, from which he holds the degree of Doctor of Philosophy. At the Michigan Agricultural College he developed the work of his department both in scientific investigation and in the solution of practical problems confronting the farmers of the State. He was also vice-director of the experiment station. Dr. Marshall is one of the foremost microbiologists of the country, is an active leader in many scientific associations, and is a recognized authority in the department of learning to which he gives his chief attention.

William D. Clark was elected professor of forestry in place of Associate Professor Moon, resigned. Professor Clark graduated from the classical course of Yale University and from the forestry school at the same institution. He has had a wide experience in forestry, which has taken him to many forests of the United States, including those of Porto Rico, Texas and the Rocky Mountains. For the past three years he has been connected with the school of forestry at the Pennsylvania State College.

Ernest Anderson was elected assistant professor of general and physical chemistry. Dr. Anderson received the degree of Bachelor of Arts at Trinity College, Texas, in 1903. Later he graduated at the University of Texas and pursued graduate study at that institution. In 1906 he entered the University of Chicago as an advanced student in chemistry and as an assistant on the teaching force of that department. In 1909 he was granted the degree of Doctor of Philosophy from that university. Dr. Anderson's work, in addition to that of teaching, has led him into chemical research under one of the foremost research chemists in the country.

Ezra L. Morgan was appointed community field agent in the extension service. Mr. Morgan was reared on a farm in the middle west, and graduated from the McKendree College, Ill., in 1904. Subsequently he spent six years in county Y. M. C. A. work. For the past two years he has been engaged in graduate study in economics and rural sociology at the University of Wisconsin, which institution granted him the degree of Master of Arts in 1912.

Orion A. Morton was elected to a vacancy in the department of agricultural education occasioned by the resignation of Floyd B. Jenks. His work is chiefly in the extension service and will consist in part of the development of boys and girls' clubs throughout the State. Mr. Morton is a normal school graduate and has spent several seasons at the summer schools of the Hyannis Normal School, the Massachusetts Agricultural College, and the Teachers' College, New York City. He was for many years superintendent of public schools at Marlborough, Mass., where he made a notable reputation as an able administrator and as an educator of liberal views.

Henry E. Smith was elected assistant professor of English. Professor Smith received his advanced training at the University of Chicago and at Yale University where he earned the degree of Master of Arts. He has had wide experience as a teacher, having served on the faculty of the North Dakota Agricultural College, the Washington State Normal School, Tabor College, Iowa, and Westminster College.

The following-named instructors and other officers of the institution have been engaged during the year: —

*In the Academic Departments.*

| POSITION. | Name. | Institution from which graduated, and Degrees. | Year of Graduation. |
|---|---|---|---|
| Assistant in chemistry, | Robert H. Bogue, | Tufts College, B.Sc., | 1912 |
| Instructor in poultry husbandry. | Abbott A. Brown, | University of Wisconsin, B. Sc. Agr. | 1912 |
| Instructor in pomology, | Walter W. Chenoweth, | University of Missouri, M.Sc., B.A. | 1912 |
| Buttermaker, | Samuel Coons, | – – | – |
| Assistant in physical education. | William J. Fitzmaurice, | – – | – |
| Instructor in agronomy, | Elmer M. McDonald, | University of Illinois, B.Sc. Agr. | 1910 |
| Instructor in English and public speaking. | Walter E. Prince, | Brown University, B.A., M.A. | 1907 |

*In the Experiment Station.*

| | | | |
|---|---|---|---|
| Assistant chemist, | Carlos L. Beals, | Massachusetts Agricultural College, B.Sc. | 1912 |
| Secretary to the director, | Benjamin G. Southwick, | Massachusetts Agricultural College, B.Sc. | 1912 |
| Assistant in horticulture, | Howard A. Turner, | Massachusetts Agricultural College, B.Sc. | 1912 |

### *In the Extension Service.*

| Position. | Name. | Institution from which graduated, and Degrees. | Year of Graduation. |
|---|---|---|---|
| Expert in farm management, | Herbert J. Baker,[1] | Massachusetts Agricultural College, B.Sc. | 1911 |
| Supervisor of correspondence courses. | Arthur T. Dailey, | University of Vermont, B.Sc. | 1911 |
| Field agent, Barnstable County. | Albert W. Doolittle (part time). | – – | – |
| Instructor in pomology, | Ralph W. Rees, | Oregon Agricultural College, B.Sc. | 1911 |

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[1] Transferred from the experiment station.

### *In the Clerical Force.*

| | |
|---|---|
| Cashier, treasurer's office, | Harold A. Crane. |
| Clerk, department of chemistry, | Miss Lina Fisher. |
| Stenographer, experiment station, | Miss Grace E. Gallond. |
| Clerk, extension service, | Miss Hannah Griffin. |
| Clerk, department of poultry husbandry, | Miss Mary R. Kingsbury. |
| Clerk, dean's office, | Miss Virginia Noble. |
| Stenographer, division of horticulture, | Miss Gladys E. Russell. |

## Thomas Canavan.

The following resolutions on the death of Mr. Thomas Canavan, which occurred July 14, 1912, were adopted by the trustees' committee on buildings and grounds and subsequently by the Board of Trustees: —

Mr. Thomas Canavan, who passed away July 14, 1912, was for forty-five years the faithful and loyal servant of the Massachusetts Agricultural College. His efficient services were always highly valued; his personality gained for him universal respect, and his kindly attitude toward all endeared him to those with whom he came in contact.

The trustees of this institution join his many friends among alumni, faculty, and students in mourning his loss, and hereby desire to record their expression of sympathy to his daughter and other relatives in these days of sorrow.

## Resignations.

S. Francis Howard, after a year's leave of absence which was spent in study at Johns Hopkins University, and which gained for him the degree of Doctor of Philosophy, resigned as assistant professor of chemistry. Professor Howard has devoted fourteen years to efficient work in teaching in the department of chemistry. As a loyal alumnus, hard-working teacher, and earnest man, Professor Howard had made a splendid record of service.

Frederick F. Moon resigned as head of the department of forestry to accept a similar position at Syracuse University. Professor Moon succeeded in his two years' incumbency of this position in establishing the department on a sound basis and the teaching on a high level of effectiveness and enthusiasm.

Floyd B. Jenks resigned his position in the department of agricultural education to accept a call as expert in agricultural education in the United States Bureau of Education. Professor Jenks had laid good foundations for a plan of organized agricultural education as a part of the State public school system.

The following table indicates all resignations that have occurred during the year: —

| POSITION. | Name. | Successor. |
|---|---|---|
| Assistant in chemistry, | Harold S. Adams, | Robert H. Bogue. |
| Secretary to the director of the experiment station. | Herbert J. Baker,[1] | Benjamin G. Southwick. |
| Clerk, division of horticulture, | Helen Granger, | Gladys E. Russell. |
| Assistant professor of chemistry, | S. Francis Howard, | - - |
| Supervisor of correspondence courses, | Albert R. Jenks, | Arthur T. Dailey. |
| Assistant professor of agricultural education. | Floyd B. Jenks, | Orion A. Morton. |
| Associate professor of forestry, | Frederick F. Moon, | William D. Clark. |
| Extension instructor in pomology, | Alvah J. Norman, | Ralph W. Rees. |
| Assistant, experiment station, | George R. Pierce, | - - |
| Secretary to director of experiment station. | Benjamin G. Southwick, | - - |
| Assistant in horticulture, experiment station. | Howard A. Turner, | - - |
| Assistant in chemistry, | William A. Turner, | - - |
| Instructor in English and public speaking. | Howard DeF. Widger, | Walter E. Prince. |

[1] Transferred to extension service.

## *Change in Title of Officers of the Institution.*

| NAME. | Former Title. | Present Title. |
|---|---|---|
| Edward M. Lewis, | Assistant dean and assistant professor of literature. | Associate dean and professor of literature. |
| Alexander E. Cance, | Assistant professor of agricultural economics. | Associate professor of agricultural economics. |
| Clarence E. Gordon, | Assistant professor of zoölogy and geology. | Associate professor of zoölogy and geology. |
| Sidney B. Haskell, | Assistant professor of agronomy, | Associate professor of agronomy. |
| Charles A. Peters, | Assistant professor of inorganic and soil chemistry. | Associate professor of inorganic and soil chemistry. |

## THE YEAR IN THE DEPARTMENTS OF INSTRUCTION.

*In the Division of Agriculture.* — Progress has been made in furnishing the division of agriculture with much-needed room and equipment. Flint Laboratory, the new dairy building, was finished and available for use Sept. 1, 1912; it has been made temporary headquarters for the division, furnishing offices for all the departments and several classrooms and laboratories other than those used by the dairy department. The whole building, however, should, in the very near future, be available for the uses for which it was designed, namely, dairy instruction and investigation. The equipment and machinery for this building, including refrigerating machinery, have been installed and will give opportunity for the best instruction in all branches of the dairy business. The teaching force of this department has been increased by the addition of an assistant who will devote most of his time to the laboratory work.

In the department of animal husbandry, the dedication of the Grinnell Arena during farmers' week should be mentioned. The work of the department has also been improved by the construction of a sheep barn, and the purchase of sheep for instructional purposes. A pair of pure bred Percheron mares have also been purchased during the year.

The equipment of the department of poultry husbandry has been increased by the addition of a laboratory building, a breeding house, the completion of a long laying house and facilities for experimental incubation, apart from the student incubator cellar. The increasing work of this department has demanded the services of an additional instructor. Through the extension office many calls come for the services of the head of this department, and the additional teaching assistance will give him more time to devote to this outside work.

The equipment of the department of agronomy has been somewhat increased by fitting up the laboratory in the basement of south college, formerly used by the department of dairying. This increase, however, does not keep pace with the increased registration of students. The instruction force of this department has been supplemented by the employment of another instructor.

The department of farm administration has begun a series of field investigations in farm management, under a co-operative arrangement between the extension service and the office of farm management of the United States Department of Agriculture.

The addition of 62 acres of land adjoining the south boundary of the college farm has not heretofore been noted. This is excellent land, but not now in a high state of cultivation; a good deal of it has been cleared during the year and will be brought into good tilth as soon as possible.

*In the Division of Horticulture.* — The work in the various departments of this division has, during the past year, progressed along much the same lines as followed formerly. The gardens, orchards and greenhouses are used extensively as laboratories and are considered as of utmost value in augmenting the classroom instruction given in the different studies. The new fruit-packing and storage building is constantly proving its worth as a laboratory for those specializing in pomology.

The department of landscape gardening is now entirely responsible for the care of the college grounds; this arrangement has been observed for about three years and the advantage of assigning the full responsibility to one department is constantly in evidence; a marked improvement has been noted during the past year in the general appearance of the lawns, walks and drives of the campus.

*In the Division of Science.* — The chairman of the division states that "there has been no change in organization since the last catalogue was prepared. The several departments are working in harmony, although necessarily very independently of each other as relates to the collegiate work.

"I am of the opinion, gained from talks with the men at the head of the several departments, that the most pressing need at the present time, from the academic point of view, is a major course in pure agricultural science. By this is meant a course that would fit graduates to take up lines of scientific work in agricultural or other scientific institutions, and enable them to hold their own with graduates of other institutions that make a specialty of fitting men for scientific teaching and investigation."

*In the Division of the Humanities.* — The division, in the opinion of its head, is in a "state of flux until it is seen how the major system of courses will operate. There may be an elimination of some courses unfit to survive by the gravitation of students in search of the best work for their minor requirements. It will take a year or two more to see clearly how the elective courses will tend."

There are several courses in the division with small registration; and unless these courses are more freely elected, doubtless they should be dropped. It is important to gather equipment about the best courses, make them profitable and interesting, and use the energies of the faculty where they will count for greatest fruitage. The head of the division places emphasis upon a wider study of literature as well as on the need of increasing somewhat the opportunities for the study of general narrative history in order to enable students to get historic facts for the background of their other work.

Probably no departments of the institution appreciate the limitations of our present library facilities so fully as the various departments in this division. The library quarters are very much restricted. The ventilation is not good. There is neither room nor table space for individual work. In fact, the whole equipment is entirely inadequate for satisfactory work. A college library in no small degree determines the standing of the institution. If facilities for good library work are absent, it seriously affects the efficiency of the scholarship.

The departments feel seriously the need of a building which will house all the departments of the division of the humanities under one roof. As it is, the various departments, and even the instructors, are scattered about the campus, — many of them without definite headquarters. Under these conditions, *esprit de corps*, concentration of effort, and administrative efficiency are difficult to maintain.

*In the Division of Rural Social Science.* — This division consists of the three departments of agricultural education, agricultural economics and rural sociology.

In agricultural education the effort thus far in the collegiate work has been to prepare teachers for agricultural high schools. The number of men doing this work has been somewhat disappointing; this is probably due in part not only to the fact that commercial positions pay larger salaries, but that to the average man the work is more attractive. Many men are willing to teach only as a last resort. Our students, perhaps, do not yet sufficiently realize the opportunities for interesting work and helpful service that are available to the teacher of agriculture. The salaries paid are not excessive, but they are reasonably fair. It is to be said that the present enrollment in the various courses offered in the department shows a gratifying increase.

In the department of agricultural economics the main strength of the work lies at present in the course required of all sophomores. This course gives to all our students an introduction to the economic problems that confront the agricultural business. There are also advanced students who are investigating some of these problems in a specialized way.

The department of rural sociology should have an introductory course required of all students, but it has not as yet been possible to bring that about. When that is done, all our students before entering the junior year will have had an introduction to the whole field of the agricultural problem, in its practical, scientific, economic and social aspects.

There is a strong feeling on the part of the instructors in agricultural economics and rural sociology that majors should be offered in both of these departments in order that men may specialize and fit themselves for some of the new positions that are opening for men trained in these subjects.

*In the General Departments. Library.* — During the past year 2,535 accessions were made to the library collection; the total number of volumes now in the library exceeds 40,000. The task of recataloguing has continued with gratifying rapidity; in the last year over 7,700 books were recatalogued, and the total number recatalogued since the work was started in 1909 is 18,430.

About a year ago the library publicly announced that it was prepared to loan collections of books on agriculture and country life to libraries in the State; in ten months 37 of these circulating libraries were sent out; an average of 24 books and pamphlets were shipped each time and these were widely distributed through the local libraries.

The faculty and students now use the library to a greater extent than ever before, and are constantly making it a real educational laboratory. For this and other reasons the need of adequate library space is felt very keenly by all.

*Military Science.* — During the past year the regiment has been divided into two battalions of three companies each and a band; the companies average about 55 men. All the members of the three lower classes are required to drill, and at present 19 members of the senior class are electing drill, making the total enrollment in the military department 430. No men are excused permanently from drill; those physically unable to drill are required to work in the office or on the rifle ranges. The general instructions of the war department have been fully complied with; three hours of practical work a week during drill periods are required of all students enrolled in the department. In addition, theoretical instruction is given to members of the sophomore and junior classes one hour a week during the year. Great interest is still maintained in rifle practice; the indoor rifle team again won the intercollegiate championship of the United States, while the outdoor team won second place.

*Physical Education and Hygiene.* — The work of the department during the past year has been conducted along the following lines: —

1. The physical examination of each freshman to ascertain the condition of health and physical development, and to detect defects which may exist, especially in sight, hearing, heart and lungs. Each person thus examined is advised as to the proper form of exercise to take to suit his individual condition. The examination and interview require about thirty minutes for each man.

2. The freshman class receive instruction in physiology and personal hygiene through a course of lectures given by the physical director.

3. During the winter months the department requires three hours of physical exercise per week of each member of the three lower classes. Those men who have been found by examination to be physically normal are permitted to elect one of the several athletic activities; those who have been found to be below normal, physically, are given individual instruction. Walking trips may be substituted for physical exercise in the gymnasium; during the past year from 75 to 100 students elected this form of exercise.

4. The work of the indoor classes of from 30 to 40 men consists of gymnastic exercises and such games as basket ball and indoor baseball.

5. The physical director is general manager of athletics, supervising the arrangements for contests with other colleges, buying the supplies for the teams, assisting in the coaching, and having final control of the conduct of players and games, and encouraging the student body to compete in intramural contests.

## The Graduate School.

During the year Dr. Charles E. Marshall of the Michigan Agricultural College was elected to the position of director of the graduate school. Dr. Marshall contemplates making in the near future a thorough study of the organization and work of graduate schools of agriculture and allied sciences, both in this country and abroad. After his return to the college, which will be prior to the opening of the next college year, it is expected that he will make a full report to the faculty and trustees, embodying recommendations as to the future development of the graduate school at this institution.

## The Year in the Experiment Station.

I regret to report that during the spring Dr. W. P. Brooks, director of the experiment station, became seriously ill. He was immediately granted a leave of absence and is still on leave. During the autumn his convalescence has been rapid, and it is sincerely hoped that in the near future he will again be at his important post with recovered strength.

*Agricultural Department.* — The work of experimentation with fertilizers on various plants has gone on as in the past. The Graves' orchard yielded heavily, the estimated value of the fruit being $500. The asparagus field at Concord bore a large crop for its fourth year's cutting, and the lightness of the attack of rust that it suffered gives promise of satisfactory results next year. The cranberry bog is in excellent condition, and while the crop was light this year, a maximum yield is anticipated for next season.

*Botanical Department.* — The routine work of this department has been similar to that of other years, consisting of the diagnosis of diseases, determination of plants, correspondence of a technical nature, seed germination, separation and purity testing.

*Department of Plant and Animal Chemistry.* (*a*) During the year the research work has made substantial progress; at present, four experts give practically their entire time to this activity.

(*b*) The inspections have gone on with satisfaction; during the year over 1,100 samples of fertilizers and 1,000 samples of feedstuffs have been collected and analyzed.

(*c*) Samples of agricultural products such as milk, cream, concentrated and coarse fodders, soils, waste products suitable for fertilizing purposes, waters, vinegars and the like are constantly being received, examined and reported upon.

(*d*) Work in connection with animal nutrition includes the examination of feedstuffs, milk and butter, and in plant nutrition, the analysis of crops and soils.

*Department of Entomology.* — Over a thousand field tests have been made in studying the burning of foliage by insecticides. Good progress is noted in studying parasites. Observations on dates of hatching of scale insects have continued, and also the study of methods of controlling the wire worm. Experiments were for several months conducted on the onion maggot, and several commercial insecticides were tested.

In apiculture, the work on color vision of bees is progressing; photographic and numerical records have been kept. Study has been given upon an instrument for counting hive bees as they pass into a hive, and upon the transportation of bees without combs. Important observations have been made on the use of bees in greenhouses.

*Department of Horticulture.* — The experimental work of the year has gone on without special incident; studies on the climatology of the apple have been published during the year and constitute a notable contribution to the scientific knowledge of pomology. The work in plant breeding has been making excellent progress.

*Department of Poultry Husbandry.* — Three lines of experimentation are being undertaken: (1) individuality in hens, studied by trapnesting, and subsequently determining the egg-yield, percentage of fertility, and hatchability; (2) digestion experiment to determine value of a widely advertised hen food; (3) effect of food on flavor and odor of eggs.

*Department of Meteorology.* — The work of the year has necessarily followed the routine of previous years; co-operation with the Weather Bureau has been continued as usual, and the regular monthly issue of the weather bulletin has been kept up.

*Department of Veterinary Science.* — Investigation of obscure diseases of animals has been carried on in response to requests for information, as, for example, the recent definite determination of white diarrhœa in chicks.

## The Year in the Extension Service.

No attempt has been made to enlarge the activities of the service during the past year, but a consistent effort has been made to organize, systematize and to put on a sounder basis the different lines of work which we are called upon to do. The work on the whole for the year has progressed in a satisfactory manner, and has unquestionably grown in the respect of the people of the State. The annual appropriation for this work was increased from $20,000 to $50,000 by the Legislature of 1912.

Considerable time has been spent in planning a type of organization which will enable every department of the college to contribute in some measure to the work of the service, and at the same time insure unity, harmony and efficiency of administration and teaching. To the end that the work of other institutions might be studied, the director made a trip to institutions in Wisconsin, Iowa, Nebraska, Kansas, Missouri, Illinois and Indiana. When the material and information obtained on this trip can be worked over, valuable suggestions for the work here will be forthcoming.

### *New Features of the Work during 1912.*

A very successful apple-packing school was conducted by the department of pomology, assisted by an expert from Hood River, Ore.

Extension schools five days in length were held in five towns. Judging from the reports which have come from these communities, these schools are the best pieces of extension service carried on away from the college.

Work by the extension service in community studies has been started, involving a definite policy and program for co-operation of all agencies within communities, for social, economic, religious and educational advancement.

The boys' and girls' club work is being further organized. Exhibits and round-up meetings have been held this fall. Schools all over the State are rapidly being brought into line for work next year. The records in a contest for boys, the prizes in which will be free trips to Washington, Boston and farmers' week at Amherst, are now nearly complete.

Field agent work has been started in Barnstable County.

A definite program for work in civic improvement is being developed.

Through the generosity of a friend of the college, the services of a woman expert in home economics were given to the college for a period of three months during the year. She gave instruction in domestic science in the extension schools, and visited several towns. The need of this work was shown by its immediate popularity and the large number of requests which at once came from several communities for more of this teaching.

Fourteen stock-judging contests for boys were arranged and conducted at as many agricultural fairs. More than a hundred boys competed, and a goodly number participated in the final contest at Brockton, in which scholarships at the college were offered as prizes.

### *Co-operation with Other Organizations.*

The policy of co-operating with other worthy organizations in any useful work which comes within the province of the agricultural college is being adhered to. Further co-operation between the organizations mentioned on pages 27–28 of the 1911 report has taken place.

New relationships have been established. This year the Pittsfield and Milford Y. M. C. A.'s will have a series of meetings. A good deal of work has been done for the western Hampshire board of trade. Assistance has been rendered the social service commission of the Massachusetts Federation of Churches. Several organizations not previously represented held meetings at the college during farmers' week.

Due to some visits of extension men to other State institutions, twenty-five farm superintendents and other officers of these institutions attended farmers' week.

A desire and willingness on the part of existing organizations all over the State to co-operate in movements for upbuilding the rural life of the Commonwealth is found to be almost universal.

So many of the recommendations made on pages 30–31 of the 1911 report still remain to be carried out that it seems almost useless to add more at the present time. Of those mentioned, the director desires to emphasize two, and to ask that these be given consideration before other things are taken up: —

1. That a travelling instructor, provided with an automobile and equipment, be engaged for demonstration work in rural districts.
2. That a woman with a training in home economics, who possesses good organizing ability, be engaged for extension work in home economics and domestic science.

There will be need of more money by the end of the present year. Every effort should be made to secure the passage by Congress of the agricultural extension bill. Even though this passes, appropriations of at least $10,000 for specific purposes in addition to what the State is now giving should be asked for in the budget that is to be made up in October, 1913.

## THE IMMEDIATE NEEDS OF THE COLLEGE.

Fundamentally, the need of increased appropriations, both for maintenance and for buildings, is due in part to the growth of the college in number of students, but also in part to the increased activities of the college made necessary by the rapidly enlarging field of agricultural research, instruction and dissemination. Our understanding of the rural problem in Massachusetts is constantly broadening, and as our conception of the problem broadens, the necessity of broadening the work of the college in order to help solve the problem also develops.

No attempt is made at this point to discuss the needs of the college for increased appropriations, except those that are of immediate consequence. Perhaps the most effective way of indicating the present needs of the college is to outline the reasons that underlie the action of the trustees in formulating the legislative budget for the ensuing year.

## THE LEGISLATIVE BUDGET FOR 1913.

The budget to be presented to the Legislature of 1913, as approved by the Board of Trustees at its meeting in Boston, Nov. 8, 1912, may be summarized as follows: —

*For Increase in Current Annual Appropriations.*

| | Available for 1913. | Requested for 1914. | Increase. |
|---|---|---|---|
| Investigation, | $15,000 | $30,000 | $15,000 |
| Instruction, | 75,000 | 95,000 | 20,000 |
| Repairs, | – | 15,000 | 15,000 |
| | – | – | $50,000 |

*For Special Purposes.*

| | |
|---|---|
| Agricultural building, | $210,000 |
| General improvements and repairs, | 40,000 |
| Land and sewers, | – |

### *Statement of Reasons for Requested Increases in Current Funds.*

*For Investigation.* — Heretofore the burden of financing investigations and experiments carried on by the institution through its agricultural experiment station has been borne chiefly by the national treasury, from which we have secured for some years about three-fourths of the annual cost of the experiment station. Last year the Legislature added $4,500 to the investigation item, with the unwritten understanding that the major part of it was to be used for investigations in poultry culture. There are, however, a great many lines of investigation applicable to the needs of Massachusetts farmers, and highly important in themselves, that are being neglected by the institution simply for lack of funds. The trustees ask, therefore, that the annual appropriation for investigation be increased from $15,000 a year to $30,000 a year. Some of the projects which it is proposed to take up with these increased funds are listed as follows: —

In floriculture: The study of certain plants with regard to their value for forcing for winter bloom; the study of factors by which the light efficiency of greenhouses may be increased; the effect of commercial fertilizers on carnations; the effect of different fertilizers on roses; co-operative experiments with regard to insect and fungous diseases troubling greenhouse plants.

In market gardening: Storage experiments with vegetables, both as regards probable preservation and market values.

In veterinary science: The study of important animal diseases along lines that are not being worked out elsewhere in the State.

In microbiology: Investigations in soil bacteriology. This is a line of work that is almost completely neglected, and yet of the utmost consequence in agricultural science.

In pomology: Spraying experiments with special reference to the aphis and curculio; experiments in soil management in apple orchards; experiments with fertilizers in peach orchards; experiments in plum growing; studies of the adaptation of apple varieties.

*Studies of Agricultural Practices and Conditions.* — The college has been endeavoring for some years to secure sufficient funds to prosecute fundamental studies of the actual practices and conditions under which the farmers of the State are working. For example, a thoroughgoing study of present methods of dairy management will perhaps do as much as any other one thing to assist the dairymen to a larger success, especially if this study is combined with a careful investigation of the market conditions under which milk is sold and distributed. The milk question is perennially before us for discussion, and yet with all that has been said the most conspicuous fact is our lack of knowledge of actual conditions of production and marketing. There is no single appropriation that can be made by the Legislature that will be of larger service in settling this problem than an appropriation which will permit experts to study thoroughly the conditions which surround the business. What has been said of dairy farming applies equally to other phases of agriculture in the State. It is high time that this institution is supported by the Legislature in its desire to study all of those conditions under which the farmer must work, and to study with sufficient thoroughness to be of practical assistance to him.

### *Instruction.*

The trustees recommend an increase in the annual appropriation for instruction from $75,000 to $95,000. Although we have added considerably to our instruction force in the last few years, that staff is still inadequate for the best results, both with respect to the subjects now being taught and with respect to the introduction of new subjects made imperative by our rapidly expanding knowledge of agriculture and the rapidly increasing calls for highly trained men. Instructors are needed in English, physical education, zoölogy, chemistry, botany, landscape gardening and agronomy. In microbiology a trained teacher and investigator is needed immediately in order to give the courses already planned. For some years we have been endeavoring to establish a department of rural engineering. This important subject has received very little attention at our hands, wholly for lack of funds. The trustees agree that it is the duty of the college to bring to the attention of the people of the State more completely than we are now enabled to do the ways by which the college can render service to all those interested in agriculture and country life; provision should be made for a man to develop publicity work. There is also a necessity for some increase in salaries. It has not been the policy of the college to increase every instructor's salary every year, but we do desire to pay salaries commensurate with the services of well-trained and efficient teachers. There is no doubt but our men as a rule are underpaid in comparison with professors in some of the liberal-arts colleges, and in comparison with men doing similar work in western agricultural colleges.

### *Repairs.*

Last year the trustees asked for an increase of $30,000 in current annual appropriations to be divided equally in purchase of equipment and in repairs. The Legislature granted an increase of half that amount, and the trustees have decided to make that apply to equipment. The argument for a current annual appropriation for repairs still holds. In a plant inventoried approximately at $600,000, an item of $15,000 a year for general repairs is certainly not excessive. It is an annual charge that cannot be disregarded. It should be made a part of the annual appropriation.

### *Statement concerning Requests for Special Appropriations.*

*An Agricultural Building.* — The main item which the trustees desire to press before the Legislature this winter as a special appropriation is one of $210,000 for an agricultural building. I cannot do better than to quote from my report of a year ago concerning the need of this building: —

> Although the college has been open to students nearly forty-five years, it has never had a building devoted specifically to agricultural teaching.
>
> Practically every agricultural college in the country finds it necessary and desirable to make such a building one of the most important on the campus.
>
> The rapid increase in our agricultural students has crowded the agricultural departments out of their old quarters. It is almost impossible to do efficient teaching under present conditions.
>
> The winter short-course students are also inadequately provided for.
>
> The proposed building will have three stories and a basement, and contain offices, classrooms, and laboratories for the departments of farm administration, agronomy, animal husbandry and agricultural engineering. It is proposed to erect a fireproof building and to equip it in harmony with the recent developments in these lines of work.

*General Improvements.* — The trustees ask for an appropriation of $40,000 as a special fund for general improvements, including repairs that will be necessary during the summer of 1913 and prior to the time when the item for repairs in the current annual appropriation, which it is hoped the Legislature will make, can become available. A large proportion of the items which make up the total of $40,000 have been placed in the legislative budget in former years, and, of course, the need for these improvements grows greater each year. The principal items comprise a general overhauling of south college, which is used partly as dormitory and partly as quarters for administrative departments; important extension of the water main; an addition to the young stock barn, absolutely necessary; the building of a piggery; important additions to the poultry plant; new walks; a greatly needed piece of macadam road; the construction of a much-needed bungalow for men employed regularly at the dairy barn and on the farm.

*The Questions of Land and of Sewers.* — There are several problems relative to the acquiring of land for horticultural and forestry purposes that have not yet been settled by the trustees for lack of adequate data. It is possible, however, that decisions may be reached in time to present a resolve to the incoming Legislature for appropriations for these purposes. The last Legislature passed an act enabling the town of Amherst to construct an outlet for its sewerage system. The act permitted the co-operation of the college, with the condition that the college should share in the expense. At this time it is not known what this share will mean in the way of appropriation, so that no specific amount is named in this report.

*Other Needed Buildings.* — I dislike to call attention to the fact that the trustees have this year omitted from the legislative budget important buildings that have heretofore been asked for but not granted. This omission is due not to any feeling that the need has in any way lessened, but simply to the desire to press for the agricultural building. Among so many needs for classrooms and laboratories it is difficult to choose, but the wise thing seemed to be to make it clear to the Legislature and to the people of the State that our most pressing building need is the agricultural building. The other buildings on which the trustees have estimates, and which we feel should be built as soon as possible are: —

| | |
|---|---|
| Student dormitory, | $30,000 |
| Addition to French hall, | 35,000 |

## THE RELATION OF THE COLLEGE TO THE ORGANIZATION OF MASSACHUSETTS AGRICULTURE AND COUNTRY LIFE.

In the president's report of one year ago there was a brief discussion of "the relationships of the college," in which mention was made of the need of co-operation with the public school system, agricultural schools, the normal schools, the State Board of Agriculture and voluntary associations. It is impossible to consider the work of the college on broad lines without constantly recurring to this question of relationships. Our work as a college is that of contributing to the solution of the rural problem in Massachusetts. There are other agencies and forces also contributing, each in its own way. There must, therefore, be a recognition of the need of working together, and consequently of understanding each other's work. There is a tendency to develop a multiplication of agencies, owing to the greatly renewed interest in the affairs of country life. Massachusetts has been conservative in this respect, but in some parts of the country there is serious overlapping and duplication of effort. The matter has become so serious that it really takes on the guise of a national question. At a recent meeting of the Association of American Agricultural Colleges and Experiment Stations a resolution on this subject was introduced. After discussion it was referred to the executive committee of the association, with instructions to study the problem thus raised and to make the general question a prominent subject for discussion at the next annual meeting. The resolution was substantially as follows: —

> *Whereas,* The various agencies for agricultural education in America are multiplying with great rapidity, and
>
> *Whereas,* We believe that there is danger of serious loss of energy and increase of expense, on account of overlapping on the part of these agencies as they carry on their work; therefore
>
> *Resolved,* That this association advocate the appointment of a National Commission on Agricultural Education (preferably a permanent commission), which shall be charged with the duty of inquiring into, and reporting upon, the organization and policy that, in the opinion of the commission, should prevail in the expenditure of public moneys provided for the United States Department of Agriculture, for State boards, or departments, of agriculture, for land-grant colleges, for secondary schools of agriculture, or for any other institution for agricultural research, teaching or extension, to the end that such funds may be applied in the most economical, efficient and worthy manner to the production of results of permanent value. It will be especially incumbent upon the commission to indicate and advise concerning the fundamental functions of these various institutions in the upbuilding of American agriculture and country life, and their relationships one to the other, so that there may be a minimum of overlapping, and, on the positive side, a constructive policy of definite co-operation. Such a commission might also well become the advisory board with respect to the use of private funds for these same purposes.

In connection with the discussion of this resolution it was suggested that each State should move toward the organization of a commission on agricultural education, or of some similar body, charged with the duty of ascertaining how the various agricultural forces in each State may be co-ordinated.

Because of the fact that this general subject of bringing together in some co-operative way the efforts of various agencies and institutions interested in agriculture and country life has become a national question in the realm of agricultural college discussion; and inasmuch as in Massachusetts there are already evidences of a need of a clearer understanding of the situation; and also because this college cannot do its best work except by maintaining proper relationships to other organizations, I have thought it timely to discuss at some length the problem thus raised, under the title, "The Relation of the College to the Organization of Massachusetts Agriculture and Country Life."

### The Outlook for Agriculture in this State.

The outlook for the agricultural business in Massachusetts was never so promising as at the present day. An examination of the appended tables shows a really remarkable development in the agriculture of the State, in spite of the smaller acreage of improved land. It is true that values are influenced by the general rise of prices; nevertheless, farming is prosperous as compared with the situation thirty years ago, or even ten years ago.

These figures also mean a rapidly growing market, particularly for products grown not too far from the consumer. Prices rule high as compared with other parts of the country.

There is also a new interest in agriculture on the part of the farmers themselves, on the part of business men and on the part of residents of the cities. All these things give us courage to believe that we are at the beginning of a great revival of the agricultural industry in Massachusetts, and, indeed, in all New England.

*Agricultural Statistics of Massachusetts (United States Census).*

| | 1880. | 1890. | 1900. | 1910. |
|---|---|---|---|---|
| Acreage of land in Massachusetts: — | | | | |
| (*a*) Land in farms, | 3,359,079 | 2,998,282 | 3,147,064 | 2,875,941 |
| (*b*) Improved land, | 2,128,311 | 1,657,024 | 1,292,132 | 1,164,501 |
| (*c*) Unimproved land, | 1,230,768 | 1,341,258 | 1,854,932 | 1,711,440 |
| Value of agricultural products, | $24,160,881 | $28,072,500 | $42,298,274 | $59,901,277 |
| Value of product per acre of improved land, | $11 33 | $16 94 | $32 73 | $51 44 |
| Rural population, | 866,071 | 736,890 | 919,541 | 1,103,248 |
| The population of incorporated cities, | 917,014 | 1,579,234 | 1,809,644 | 2,263,168 |

## The Agricultural Advantages which Massachusetts offers.

We may be compelled to admit that Massachusetts can hardly become one of the leading agricultural States quantitatively. As compared with Iowa and Illinois, for example, Massachusetts cannot hope to figure prominently in farm statistics, although its possibilities in value of agricultural products are far greater than many of us imagine. But there is every reason why Massachusetts can hope to become, and ought to become, a really great agricultural State qualitatively. It is a small State. It has a fairly compact area. It has many varieties of soil and differences of altitude. It has markets among the best in the world. It has great wealth, public spirit, abundant social machinery. It is a land beautiful to look upon. It possesses splendid traditions of education. It has been a leader in the industrial, political and social life of the nation, and it still retains a large measure of that leadership. Those who work its land are largely owners of the land, and at the present time most of them are the old New England stock. Its cities and larger villages are numerous, and, as a rule, they are connected with other places by trolley lines. There are few regions of the State that are necessarily isolated.

All these things comprise the natural resources and the foundation for an ideal agriculture and country life. We ought to make the best possible use of these splendid resources, not only for profit but for securing the highest type of rural life. If we aim to make "Bay State quality" a real asset in our farm production and in the development of rural communities that are here built up, we may soon take our stand proudly as a Commonwealth containing the best type of agriculture and country life in all the world. We are already doing much to justify the claim of high quality, but our desire should be nothing short of the highest. We need a great public ambition on behalf of Massachusetts agriculture and country life, a thoroughly progressive spirit on the part of the farmers, combined with a willingness to co-operate among themselves and with other people.

## Progressive Agencies.

A catalogue of the efforts that are now being made to improve Massachusetts agriculture and country life shows that our people are not unmindful of their opportunities.

The State Board of Agriculture has supervision of 32 agricultural fairs to which it pays bounties. It held during the past year 138 farmers' institutes. It publishes an annual report, monthly crop reports, bulletins, nature leaflets and reports of other phases of its work. The work of the Dairy Bureau of the State Board of Agriculture consists in police work relative to the enforcement of dairy laws and educational work for the purpose of improving dairy products. The Board also is responsible for nursery inspection and apiary inspection, employs an ornithologist, and encourages agriculture directly by special exhibits, demonstrations and the distribution of bounties to incorporated poultry associations.

The State department of animal husbandry enforces laws relative to contagious diseases of domestic animals, and has also the power to secure proper hygienic conditions for such animals.

The forest service of the State carries on an elaborate forest-fire protection, develops reforestation, and has charge of the suppression of the gypsy and brown-tail moths. It promotes the perpetuation, the extension and the proper management of the forest lands of the Commonwealth, both public and private. On request it gives owners of forest land aid and advice in the management thereof.

The grange in Massachusetts has a membership of 32,000, with about 230 subordinate granges, in nearly as many towns of the State. It is growing and is reaching out to perform new tasks for the rural population.

The fruit and corn shows that are held from time to time are demonstrating the possibilities of both of these industries in Massachusetts, as well as illustrating better methods, and calling together people to observe what is actually being achieved.

Various chambers of commerce in the cities of the State are interesting themselves in the agricultural problems of the Commonwealth. The Boston Chamber of Commerce, the most powerful commercial body in New England, has a committee on agriculture. The Springfield Board of Trade has been notably active in co-operating with agricultural agencies. The Worcester Board of Trade has taken an interest in agricultural propaganda in that county.

The New England railways have established an industrial bureau, which interests itself in the development of agriculture as well as in that of manufacturing. Both the steam and electric railways have lent their aid in various educational enterprises on behalf of agriculture.

We have in Massachusetts a federation of churches organized on the broadest possible basis, officered by clear-visioned prophets of a better religious life. Special attention is being given to the country church, its needs and its possibilities of leadership in the building of a better rural Commonwealth.

The Massachusetts State Library Association, although existing in a State that has more public libraries than probably any other State in the Union, nevertheless has constructive plans for a wider distribution of books in the more sparsely settled communities.

The State Board of Education is carrying on a comprehensive campaign on behalf of a thoroughgoing system of agricultural education of high school grade.

Agricultural newspapers have a wide circulation in Massachusetts and are full of optimism with respect to the future of Massachusetts and country life.

The Young Men's Christian Association has an active rural work.

The Massachusetts Experiment Station is rendering a great service in various lines of control work in the testing of commercial fertilizers, of stock foods, and of dairy-testing apparatus. The experiment station also, as an organ of research, has been for years carrying on fundamental investigations with respect to the best use of Massachusetts soils and the best crops to grow on these soils.

The Massachusetts Agricultural College has over 500 students of college grade, preparing for leadership in the various agricultural vocations. It also has each year nearly 300 students taking shorter courses in agriculture.

The Extension Service of the Agricultural College is giving correspondence courses to several hundred regular readers, lecture courses and demonstrations in various parts of the State, local and State conferences for rural community development, extension schools of agriculture, educational trains, educational exhibits and demonstrations at fairs, demonstration orchards, and it is organizing dairy and agricultural improvement associations, making agricultural surveys, organizing girls' and boys' agricultural clubs, and answering tens of thousands of letters each year.

This mere cataloguing of enterprises carried on in this Commonwealth on behalf of agriculture and country life shows the enormous amount of time and energy and money which is being expended to-day, and being expended in faith of a harvest of better crops, of greater profits and of a sweeter, finer individual and community life in the rural towns of the State.

## Some Dangers in the Situation.

All this activity is good. It indicates that Massachusetts has developed the machinery by which agricultural progress may be forwarded. But there are dangers in this very fact of multiplication of effort. May I suggest two or three that seem to lie on the surface?

1. The danger of *duplication.* The more aggressive an organization or institution, the greater the danger of doing work that is being attempted, or should be attempted, by some other organization or agency. Thus money may be wasted.

2. The danger of *working at cross purposes.* There is likelihood that different ends may be pursued by the different institutions, that various agencies may plow the same field at different angles, thus nullifying the work of one another.

3. The danger of *omission.* Important things may be left undone. Institutions as well as individuals are inclined to want to do the things that are suggested by what somebody else has done.

In other words, the danger of overlapping of these various efforts may become serious and may work against the best development of our agriculture and country life.

## The Advantages of a Comprehensive Plan for advancing Agriculture and Country Life.

The considerations just mentioned are in my judgment sufficient to raise the question whether we should not at once take steps to prevent duplication and overlapping. In other words, may we not, through the development of a comprehensive plan for the upbuilding of agriculture and country life in the whole Commonwealth, not only avoid overlapping of effort, but may we not also, by setting forth an ideal, thereby advance in manifold ways and by many years the realization of our watchword, "Bay State quality"? Some of the advantages of such a comprehensive plan seem to be fairly obvious, as, for example: —

1. It would tend to prevent duplication of work and save unnecessary time and money.

2. It would give a working ideal toward which every one could strive.

3. It would assist in getting the large and important things done.

4. It would aid in securing the co-operation of all the agencies, institutions and individuals that are interested in a better agriculture and country life.

## An Ideal Program for Massachusetts Agriculture and Country Life.

I am perfectly aware that an attempt to state an ideal program for such a large movement as the development of the agriculture and country life of a State might bring upon us the criticism of practical men as well as the criticism of the theorists. Practical men are sometimes inclined to scoff at a plan that seems to be visionary, and that involves a long period for its realization, even in part. The theorists will never agree on a program. Nevertheless, I venture to suggest such a program, largely for the purpose of indicating the value of a definite plan of some sort as a basis for a comprehensive organization of agriculture and country life. We must look at the problem in the largest possible way. So far as practicable we must look at the problem as a unit, — the rural problem in Massachusetts. I suggest, therefore, the following ideal program: —

In general, we need —

1. To create enthusiasm for an enlarged Massachusetts agriculture; for an enriched Massachusetts country life.

2. To encourage every needed association and institution which is working for rural betterment and agricultural advancement in Massachusetts, and to assist each to gain definiteness, directness and efficiency for its particular task.

3. To secure the co-operation of all the agricultural interests of Massachusetts on behalf of a concerted plan for a better agriculture and country life in every rural town of the State.

4. To gain for this co-operative movement among agricultural agencies the active support of the commercial and industrial interests of Massachusetts.

5. To develop adequate publicity for Massachusetts agricultural possibilities.

6. To educate consumers as to Massachusetts-grown products of the soil, — their quality, value, and use; and in other ways to extend the market for Massachusetts agricultural products.

In particular, we need —

1. To secure an adequate inventory of Massachusetts agricultural resources.

2. To devise and carry out educational campaigns for the most efficient agricultural practice and farm management, — for the best use of every acre of Massachusetts soil, while conserving soil resources.

3. To improve the methods of marketing farm products, in order that all consumers may have a wider range of choice Massachusetts-grown products at a fair price, and that the producers may have a reasonable profit for intelligent labor.

4. To secure legislation that shall protect both producers and consumers, with justice to both, and that shall stimulate and encourage the agricultural workers.

5. To secure better highways and other means of communication in the rural regions of Massachusetts.

6. To improve the rural schools, and to build a comprehensive public system of agricultural education both for youth and for adults.

7. To conserve and develop the beauty of rural Massachusetts.

8. To increase the means of wholesome recreation for young and old in the rural communities of Massachusetts.

9. To encourage the church and its allies to renewed labor and more efficient service in all rural towns.

10. To encourage every wise endeavor for the preservation of the Massachusetts rural home, the lightening of its labors, and the widening of its influence in the community as well as upon the lives of its members.

Some such general, or ideal, platform is needed in order to give scope and breadth to the attempt to organize the rural interests of the Commonwealth. But we also need —

## A WORKING PROGRAM OF LARGE RURAL ENTERPRISES NEEDING IMMEDIATE ATTENTION.

1. *Secure the Best Use of Present Cultivated Areas.* — This implies a series of well-developed educational campaigns for stimulating farmers to follow the most approved methods. An example at hand is the attempt to secure the general use of high-grade seed-corn. Our ambition should be to make every cultivated acre in Massachusetts yield the largest possible profit.

2. *Develop the Waste and Unimproved Areas.* — There are tens of thousands of acres of waste lands, both along the coast and in river valleys, that are at present unavailable for agricultural purposes, but that when once drained might become the richest of our soils. The development of these lands must be preceded by a scientific study of their availability and a comprehensive plan for their drainage and use. Much of the land now listed as unimproved undoubtedly has uses if we could but find them.

3. *Help the Farmers to secure an Adequate Farm Labor Supply.* — This is one of the most difficult and perhaps the most important of our agricultural problems in Massachusetts. Its importance, however, rather than its difficulty should be the warrant for making it the subject of careful study and for devising methods for meeting the conditions that exist.

4. *Establish a Better System of Rural Credit.* — We are not yet sufficiently in possession of facts to be able to say just to what degree our Massachusetts farmers are lacking in facilities for securing both permanent and working capital. It is safe to say, however, that the time is soon coming, if it has not already arrived, when the need for better credit facilities will be a pressing need among our smaller landowners.

5. *Devise a More Efficient System of Marketing.* — The discrepancy between the prices paid by the consumer of farm products and the prices paid to the producer is a subject of constant comment and dissatisfaction to both parties concerned. We should attempt to organize, as soon as practicable, a system of

distribution of agricultural products which will secure prices less fluctuating than now, and such that the farmer may receive a fair profit. In other words, the wastes and excessive costs of the present system of distribution must be minimized.

6. *Perfect the System of Agricultural Education.* — A complete system of agricultural education will include the teaching of agriculture not only to college students, but also to boys and girls of high school age and to adults and young people who are not attending school. Massachusetts is well on the way toward a well-developed system. However, we must see to it that this system is based on sound principles, and that its parts work together in complete harmony.

7. *Get and keep the Right Kind of People on the Land.* — It is difficult to influence in any marked way, by agitation or by legislation, or even by education, the currents of human migration as they flow from the country to the city, or from the city to the country, or from one nation to another. But it is clear that in New England we face a very serious question with respect to the maintenance of the quality of people living on and working the New England soil. It is often claimed that this quality has appreciably deteriorated in the last century. However that may be, we know perfectly well that in many parts of New England the land is being occupied by people of different ideals and standards of living than we have been accustomed to. The question is, can we insure a high quality of immigration to our lands, either from the city or from other countries or from the west; and once these people are on the land can we insure a scheme of education that shall rapidly bring them into sympathy with, and understanding of, our best American life? Certainly we should not decline to exercise every effort to maintain the sort of rural population that we desire.

## COMPLETE ORGANIZATION OF AGRICULTURE AND COUNTRY LIFE.

It is my firm conviction that we need a complete organization of agriculture and country life in order to bring about such desirable advancements as have been described. We must secure a measurable degree of co-operation among all the factors that make for better conditions. It is perfectly true that we *can* work in piecemeal fashion, but that is not the spirit of the age and it is not the best method. Neither the State nor any group of individuals nor any organization can dictate the methods of progress or the way in which co-operation may be secured. But we can secure such an organization of all the agricultural and country life interests in the Commonwealth that they shall work together intelligently and sympathetically on behalf of the larger interests of our rural people, and thus on behalf of the welfare of the entire Commonwealth.

### THE METHOD OF ORGANIZATION.

In considering a method by which this large and complete organization of agriculture and rural life interests in Massachusetts may be achieved, the main reliance must be placed on the idea of *federation* of interests. We do not need a new organization. We simply need a getting together of existing organizations and agencies. In other words, the federal, or representative, idea is the key to the situation.

### A PLEA FOR A MASSACHUSETTS FEDERATION FOR RURAL PROGRESS.

Therefore I would recommend that the trustees authorize a call, as soon as such a step seems wise — perhaps next autumn — to the representatives of all the various interests that have been catalogued, and such others as are interested, for the purpose of discovering whether the time is not ripe for a definite federation of these interests on behalf of an enthusiastic, clear-cut, well-planned, persistent effort to bring Massachusetts agriculture and country life to its highest possible development. This movement is already under way in some of the towns of the State and, indeed, in the State as a whole, but it needs organizing.

We cannot of course state the exact form that such a movement may take. A number of towns in the State have already appointed town committees or developed town federations for rural improvement. Clearly, we must have each town seeking to make the best use of its resources before we can have the State as a whole making the best use of its resources. The heart of the movement is the attempt of each town to study its own resources and its needs, and to map out a plan for bettering conditions in the town. It has already been suggested that these town rural life "committees" (or "councils" or "federations") co-operate in a county organization of a similar type; and, finally, that representatives of these county organizations unite with the representatives of the various State-wide organizations and agencies in a Massachusetts federation for rural progress.

## THE RELATION OF THE STATE TO THE CAMPAIGN FOR RURAL PROGRESS.

It is obvious, also, that the State of Massachusetts itself, not only through legislation but through various institutions and agencies supported out of the State treasury, can and must continue to render a great service in this renewed effort to secure the best quality of agriculture and country life for the Commonwealth. This is one of the most significant aspects of our attempt to bring about a thorough organization of Massachusetts agriculture and country life. The State cannot achieve all that needs to be done working apart from private individuals and voluntary organizations, but it can and should play a vital part in the general plan.

### WHAT THE STATE SHOULD DO.

The State should —

1. Gather facts.
2. Protect.
3. Stimulate.
4. Develop.
5. Educate.
6. Provide a clearing-house for agricultural and rural life interests.

1. *The State should gather Facts.* — We need to know our agricultural resources and possibilities. We need to know existing agricultural methods. We need to know the tendencies and needs of the markets both at home and abroad.

There are two classes of facts that need gathering. The first class comprises a census of those facts that have a bearing upon the agricultural business and method. They should be gathered every year. They have to do with production, with prices, with miscellaneous agricultural statistics. The other class may be designated more completely by the word "investigation." There must be a constant study of fundamental problems of the soil and of plant and animal growth, as well as a study of those economic and social conditions that have so much influence in the farmer's work and life.

2. *The State should protect.* — It should protect the farmers against diseases and pests, against fraud and injustice. It should protect the better and honest farmers against the inferior and dishonest farmers. This protection will be secured through proper legislation enforced by appropriate executive boards or commissions.

3. *The State should stimulate.* — It should to some degree offer prizes. It should have general supervision of the agricultural-fair system. It should advertise the agricultural advantages of the State to its own people, to the people of other parts of the land, and to the people of those foreign countries that are able to contribute a stalwart and acceptable rural population to our Massachusetts farms.

4. *The State should develop.* — Without question full sweep should be given to individual initiative. At the same time, there are problems to solve so complicated, so difficult, so far-reaching that it will be almost impossible to work them out unless the State in some way lends direct aid. For example, to recur to a matter already mentioned, we have in Massachusetts tens of thousands of acres of waste land. Some of these lands are near tidewater. They can be drained only under some large scheme. Other thousands of acres of these lands are in the valleys and along streams, perhaps overflowed by waters that were once useful for manufacturing purposes, but that are no longer useful. Other thousands of acres are rough land; some of them available only for forestry purposes, but a very large proportion of them capable of development for prosperous sheep-growing or orcharding. It is only through some form of State aid and leadership that these waste lands can be developed. They are an unworked asset. They ought to be developed as soon as possible, on some comprehensive plan. They should, first of all, be surveyed and their possibilities understood.

So, also, in the development of adequate credit facilities and market facilities, the State should render necessary assistance, even though the actual business organization is co-operative among individuals or organizations.

The State can continue to assist prospective purchasers of farms in locating those farms and in furnishing information concerning the best uses to which those farms can be put.

The State can assist in securing an adequate labor supply by acting as a clearing-house for labor engagements and, what is more important, by securing from foreign countries or from the cities an adequate number of skilled laborers. The same thing is true to a large degree in the development of an adequate system of marketing of farm products.

If all Massachusetts acres are to be tilled to their full capacity, it means a larger rural population. There is a tide setting in from the city toward the country, and undoubtedly during the next ten years a great many people will come out from the cities to take farm lands and work them permanently. There is undoubtedly a considerable number of farmers in the middle west — many of them of New England descent — who for one reason or another would like to get back to New England. Some of them like the New England life; some wish to engage in certain specialties that can be developed in the east better than in the west; some would like to sell their relatively high-priced lands and buy the cheaper lands of New England. The State, through an organized effort, could encourage these people to locate advantageously in Massachusetts. It is also a matter of concern as to the type of immigrant that comes from foreign shores to settle our lands, whether he has the capacity to develop in modern agriculture, and whether he will assimilate with our American institutions. The State should see to it that efforts are made to get the right sort of people on the land.

5. *The State should educate for Agriculture.* — It should have a comprehensive system of investigation, of teaching and of extension service at the agricultural college. It should have a well-developed system of agricultural departments in our high schools and in the special agricultural high schools. So far as consistent with good educational principles, agriculture should be brought to the attention of pupils in the upper grades of the public schools.

6. To some degree, at least, *the State should provide a clearing-house for the organization of agriculture and country life.* In other words, the State itself should co-operate most intimately and cordially with a State federation for rural progress in the development of a comprehensive campaign for a better agriculture and rural life.

## THE PRINCIPLES UNDER WHICH THE STATE SHOULD MAKE ITS CONTRIBUTION TO THE ORGANIZATION OF AGRICULTURE AND COUNTRY LIFE.

If the State is to participate, as it should, in this effort to bring agriculture and country life in Massachusetts to its highest levels, there are a few fundamental principles that must be invoked.

1. *The Principle of Local Initiative.* — There should be a maximum of effort on the part of individuals and voluntary organizations. It is not the business of the State to do either for individuals or for towns what they can do for themselves. The State, therefore, should encourage individual and community initiative and discourage individual and community dependence upon outside agencies.

2. *The Principle of Co-operation.* — This principle is recognized in all our business and social life and cannot be disregarded however much we may cherish the old individualism of the past. As a matter of fact, there is little danger that this individualism, in New England at least, is likely to be crowded out. We need, rather, to encourage the spirit of working together. This principle of co-operation also means an institutional division of labor, that is, making sure that the different organizations and agencies do their own particular kinds of work, and then that all co-operate for the one large, common end.

3. *The Principle of Federation.* — It is desirable to centralize our efforts, but not to centralize authority or power. Consequently, the federal principle forms the best method for securing co-operation of individuals and institutions.

## THE MAIN AGENCIES OF STATE AID FOR AGRICULTURE.

There are two main agencies by which the State can develop its proper relationship to the organization of agriculture and country life. The first is the State Board of Agriculture; the second is the Agricultural College. This statement is not meant to convey the idea that these are the only agencies by which the State can develop its activities on behalf of agriculture and country life, but in these two center the main lines of effort in which the State should participate. They are characteristic, specialized agencies of the State. Among those miscellaneous agencies, whose function is not, however, specifically rural, are the State Board of Education, the State Board of Health, the Railway Commission, the Highway Commission, etc. All of these boards have functions that bring them into close touch with the development of a better country life. But their prime function is connected with the people as a whole and not with the rural problem specifically. They must be considered in any attempt to relate the State to a campaign for rural progress.

It would be unwise to prolong this discussion by treating exhaustively all the respective functions of these two main agencies, but it is absolutely necessary to outline in a terse way the special tasks that I believe should be developed by them. It must be remembered that these tasks will, in some degree, overlap, and that the co-operative spirit and method must be constantly used as the work is developed.

## The Function of the Board of Agriculture.

The function of a well-organized board of agriculture in an American State is not primarily educational but administrative. Among the various types of work which should be fostered and controlled by such a board are the following: —

1. The gathering of current statistical facts, especially concerning business tendencies and needs.
2. The administration of laws designed to protect the farmers.
3. The administration of those enterprises designed to stimulate and foster agriculture.
4. The administration of those efforts that have to do with the development of agriculture, in so far as the State wishes to participate in such efforts.

In these matters the board of agriculture should take the initiative. The college may help at many points.

## The Function of the Agricultural College.

The American agricultural college has as its mission education and not administration. This education divides itself very naturally into three main lines of effort.

1. Investigation, which includes not only the study of the laws of nature with respect to the soil and the growth of plants and

animals, but also an investigation of actual conditions — physical, economic, social — under which farmers work and live.

2. The education of men and women who shall be rural-problem solvers. This is accomplished through regular and special courses offered at the institution.

3. The educational function also embraces the extension service, which attempts to reach those who cannot come to the college, with the best of information concerning all phases of the rural problem.

The college, also through its extension service, should serve as a clearing-house for the general movement to organize agriculture and country life in the Commonwealth. It should co-operate heartily with the federation for rural progress, and should be in close touch with the varied efforts of the board of agriculture.

In all these matters the college should take the initiative, although at many points the board of agriculture may assist.

## The Function of Local Government.

In all this work there might well be a larger participation of local government, both of counties and towns, on behalf of a better agriculture and country life. We do not yet know by what means this larger participation may be developed, but I believe that we must rely more fully than we have ever done before on the local civic groups for practical assistance in working out our country life problems.

## The Next Step.

It is obvious that the main ideas here advanced can be realized only by some definite co-operative action on the part of the institutions and organizations most intimately connected with the development of Massachusetts agriculture and country life. It is of first importance to determine the scope of State aid to agriculture, the function of the board of agriculture, of the Agricultural College, and of other State agencies in this scheme of State aid, and the relationship of these one to another and to all of the voluntary organizations and enterprises interested.

## A COMMISSION ON AGRICULTURAL EDUCATION AND ORGANIZATION.

I therefore believe the time has come for the organization of a commission to study and report on the question of the relationship of the State to rural development in Massachusetts. I suggest a commission of seven appointed as follows: one by the State Board of Agriculture; one by the executive committee of the State grange; one by the Board of Trustees of the Massachusetts Agricultural College; one by the State Board of Education; and three by the Governor. One of those appointed by the Governor should be a practical farmer, and one should be an attorney of recognized standing.

The appointment should be for a period ending on the presentation of the report of the commission at a date not later than Jan. 1, 1915.

The members of the commission should serve without pay, but necessary expenses should be paid, and authority should be granted, under the approval of the Governor and Council, to travel in other States and, if necessary, to send member or agent delegate to Europe for the purpose of learning what is being done in other States and countries. The commission should be authorized to employ a secretary at a salary not to exceed $150 a month, should be given sufficient clerical help and should be required to present a report not later than Jan. 1, 1915. There should be an appropriation ample to carry on the work of the commission.

The special duties of the commission should be as follows: —

1. To collect all the laws of the Commonwealth bearing on agriculture and country life, and to recommend a code or group of acts designed to cover the present needs of the Commonwealth, in so far as legislation may be considered effective and desirable in the proper control and development of the agricultural industries and rural affairs in the State.

2. To report on the best methods of aiding agriculture, and the best form of organization for such State boards and institutions as are needed.

3. To present a statement relative to the best methods of coordinating the activities of the various agencies in the Common-

wealth, both public and private, which are designed to benefit agriculture and country life, and the relation of the Commonwealth thereto.

If this suggestion for a commission appointed by the Legislature seems too formidable, or is considered impracticable at the present time, it is possible that progress could be made if some one of the institutions interested should take the initiative in calling together a voluntary conference to be made up of a representative or representatives of several of the agencies interested, for the purpose of discussing the questions raised in this report.[1]

Respectfully submitted,

KENYON L. BUTTERFIELD,
*President.*

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[1] The above report was accepted by the trustees of the college, and a vote passed to the effect that the trustees favor the idea of a conference of representatives of State and other agencies interested in agriculture and country life, and that they recommend that each of the following organizations appoint a representative or representatives to such a conference for the purpose of conferring on the suggestions contained in the report: The State Board of Agriculture, The State Board of Education, The Massachusetts State Grange, The Massachusetts Society for the Promotion of Agriculture, The Boston Chamber of Commerce, The Massachusetts Agricultural College.

At the annual meeting of the State Board of Agriculture, held Jan. 7 and 8, 1913, it was voted to join in the suggestion made in the above report, and the secretary of the board of agriculture was authorized to invite the above-named organizations to elect representatives to the conference.

# STATISTICS OF THE COLLEGE.

TABLE I. — *Attendance.*

| | Registration Nov. 30, 1911. | Registration Nov. 30, 1912. |
|---|---|---|
| Senior class, | 85 | 91 |
| Junior class, | 97 | 102 |
| Sophomore class, | 127 | 125 |
| Freshman class, | 168 | 184 |
| | 477 | 502 |
| Graduate students, | 15 | 22 |
| Unclassified students, | 29 | 31 |
| Total doing work of college grade, | 521 | 555 |
| Short courses: — | | |
| Winter school, | 113 | 131 |
| Poultry course, | 74 | 80 |
| Apple-packing school, | – | 40 |
| Beekeepers' course, | 16 | 10 |
| Summer school, | 153 | – |
| | 356 | 261 |
| Total, | 877 | 816 |

TABLE II. — *Legislative Budget, 1912.*

| ITEMS. | Amount asked. | Amount granted. |
|---|---|---|
| 1. Special appropriations: — | | |
| Agricultural laboratory and equipment, | $200,000 00 | – |
| Student dormitory, | 25,000 00 | – |
| Addition to French Hall, | 25,000 00 | – |
| Addition to Draper Hall, | 25,000 00 | $25,000 00 |
| Dwelling for registrar, | 8,000 00 | – |
| Tenement house for farm help, | 6,000 00 | – |
| Sewers, | 10,000 00 | 10,000 00 |
| Department equipment, | 31,525 00 | 20,000 00 |
| Repairs and minor improvements, | 20,760 00 | 15,000 00 |
| General improvements, | 35,135 00 | 10,000 00 |
| | $386,420 00 | $80,000 00 |
| 2. Increase in current annual appropriations: — | | |
| Administration, | $5,000 00 | $5,000 00 |
| Maintenance and equipment, | 37,000 00 | 22,000 00 |
| Investigation, | 14,000 00 | 4,500 00 |
| Instruction, | 23,000 00 | 15,000 00 |
| Short courses and extension, | 30,000 00 | 30,000 00 |
| | $109,000 00 | $76,500 00 |
| Previous appropriation, | 173,500 00 | 173,500 00 |
| Total, | $282,500 00 | $250,000 00 |

## TABLE III. — *Statistics of the Extension Service for 1912.*

### *Extension Service conducted at the College.*

| | |
|---|---|
| Farmers' week, | 1,040 |
| Polish farmers' day, | 57 |
| Conference for rural community leaders, | 184 |
| Correspondence courses: — | |
| Present enrollment, | 578 |
| Courses completed or work dropped during year, | 175 |
| Number of people reached through short courses and correspondence courses, | 2,034 |

### *Extension Service conducted away from the College.*

| | |
|---|---|
| Lectures:[1] — | |
| Number given in 1912, | 591 |
| Approximate attendance, | 27,469 |
| Fairs: — | |
| No exhibits made, but members of the faculty acted as judges and gave lectures at 16 fairs throughout the State. No attendance was taken. | |
| Demonstration orchards: — | |
| Requests on file, | 34 |
| New orchards planted, | 2 |
| Renovation plots, | 1 |
| Boys' and girls' corn and potato clubs: — | |
| Number of clubs, | 127 |
| Number enrolled, | 13,462 |
| Massachusetts Agricultural College Agricultural Improvement Association: — | |
| Membership, | 137 |
| Dairy Improvement Association: — | |
| Number organized, | 3 |
| Number of members, | 55 |
| Extension schools: — | |
| Requests for schools, | 16 |
| Schools given, | 5 |
| Membership, | 351 |
| Enrollment, | 500 |
| Judging contests, | 13 |
| Enrollment, | 111 |
| Traveling libraries: — | |
| Public libraries receiving books, | 36 |
| High schools, | 1 |
| Volumes sent out, | 629 |
| Bulletins, pamphlets, etc., | 252 |
| Average size of shipment, | 24 |
| Farm visits: — | |
| Visits made, | 66 |
| Student extension work: — | |
| Evening schools held, | 4 |
| Teachers, | 9 |
| Average attendance each week, | 80 |
| Mailing list: — | |
| Facts for farmers, | 1,553 |
| Short courses, | 3,764 |
| Total number of people reached, | 49,231 |

These numbers do not include the attendance of the various meetings held at the college by organizations throughout the State.

## TABLE IV. — *Public Speakers for the Year.*

### *A. Speakers at Sunday Chapel for Year ending Nov. 30, 1912.*

**1911.**

Dec. 10. — Dr. Samuel A. Eliot, Boston.

**1912.**

Jan. 7. — Mr. Robert E. Speer, New York City.
Jan. 14. — Rev. J. S. Lyon, Holyoke.
Jan. 21. — Mr. Henry Bond, Brattleboro, Vt.

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[1] This is not accurate, as many lectures are not reported.

**1912.**

Jan. 28. — Rev. F. Boyd Edwards, Orange, N. J.
Feb. 11. — Dr. Albert P. Fitch, Cambridge.
Feb. 18. — Dr. Herbert J. White, Hartford, Conn.
Feb. 25. — Mr. W. R. Moody, Northfield.
Mar. 3. — Rev. J. W. Campbell, Newtonville.
Mar. 10. — Rev. Lee W. Beattie, New York City.
Mar. 17. — Mr. Ray Stannard Baker, Amherst.
Mar. 24. — Mr. Herbert S. Carruth, Amherst.
Apr. 14. — Rev. Robert A. Ashworth, Milwaukee, Wis.
Apr. 21. — Col. E. W. Halford, New York City.
May 5. — Mr. Jacob Riis, New York City.
Nov. 3. — Rev. Clarence F. Swift, Fall River.
Nov. 10. — Bishop Thomas F. Davies, Springfield.
Nov. 17. — Mr. Alfred H. Evans, Northampton.
Nov. 24. — Rev. Paul Van Dyke, Princeton, N. J.

*B. Speakers at Wednesday Assemblies for Year ending Nov. 30, 1912.*

**1911.**

Dec. 13. — Mr. John Nolen, Cambridge.

**1912.**

Jan. 10. — Prof. William D. Hurd, Massachusetts Agricultural College.
Jan. 17. — Dr. J. H. McCurdy, Springfield.
Jan. 24. — Rev. George M. Rowland, Auburndale.
Feb. 7. — President Kenyon L. Butterfield, Massachusetts Agricultural College.
Feb. 14. — Miss Ida M. Tarbell, New York City.
Feb. 21. — Mr. Henry Sterling, Boston.
Feb. 28. — Mr. W. M. Danner, Boston.
Mar. 13. — Pres. Harry A. Garfield, Williams College.
Mar. 20. — Mr. J. W. Pincus, New York City.
Mar. 27. — Mr. William Jessup Sholar, Boston.
Apr. 10. — Hon. Michael J. Murray, Boston.
Apr. 17. — Prof. Edgar L. Ashley, Massachusetts Agricultural College.
Apr. 24. — Pres. Frederick W. Hamilton, Tufts College.
May 1. — Mr. J. G. Phelps Stokes, New York City.
May 8. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.
May 15. — Rev. A. Z. Conrad, Boston.
June 5. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.
Sept. 18. — Pres. Kenyon L. Butterfield, Massachusetts Agricultural College.
Sept. 25. — Hon. James Logan, Worcester.
Oct. 9. — Associate Dean Edward M. Lewis, Massachusetts Agricultural College.

**1912.**

Oct. 23. — Prof. Charles E. Marshall, Massachusetts Agricultural College.

Nov. 6. — Hon. James J. Storrow, Boston.

Nov. 13. — Prof. Robert J. Sprague, Massachusetts Agricultural College.

Nov. 20. — Mr. William Chauncy Langdon, New York City.

TABLE V. — *Statistics of Freshmen entering Massachusetts Agricultural College, September, 1912.*

*A. Home Addresses of Students (classified by Towns and Cities).*

| | |
|---|---|
| Acushnet, | 1 |
| Adams, | 2 |
| Amherst, | 4 |
| Apaupo, N. J., | 1 |
| Arlington, | 1 |
| Ashfield, | 1 |
| Auburndale, | 1 |
| Beverly, | 1 |
| Boston, | 5 |
| Bridgewater, | 1 |
| Brockton, | 1 |
| Brookline, | 1 |
| Brooklyn, N. Y., | 3 |
| Canton, | 1 |
| Centreville, R. I., | 1 |
| Clinton, | 1 |
| Concord, | 1 |
| Cranford, N. J., | 1 |
| Dalton, | 2 |
| Dalton, Pa., | 1 |
| Dedham, | 2 |
| Deerfield, | 1 |
| Dorchester, | 3 |
| Doylstown, Pa., | 1 |
| East Dover, Vt., | 1 |
| Easthampton, | 1 |
| Exeter, N. H., | 1 |
| Fall River, | 1 |
| Fitchburg, | 1 |
| Flemington, N. J., | 1 |
| Florida, N. Y., | 1 |
| Forest Hills, | 1 |
| Foxcroft, Me., | 1 |
| Framingham, | 3 |
| Georgetown, | 1 |
| Great Barrington, | 1 |
| Groton, | 1 |
| Groveland, | 1 |
| Hadley, | 2 |
| Harvard, | 1 |
| Haverhill, | 3 |
| Hingham, | 2 |
| Hopedale, | 1 |
| Jamaica Plain, | 2 |
| Jefferson, | 1 |
| Kingston, | 1 |
| Lawrence, | 5 |
| Leominster, | 3 |
| Longmeadow, | 1 |
| Lowell, | 2 |
| Lynn, | 1 |
| Malden, | 4 |
| Manchester, | 1 |
| Mansfield, | 1 |
| Marlborough, | 1 |
| Mattapan, | 1 |
| Melrose, | 4 |
| Melrose Highlands, | 3 |
| Mendon, | 1 |
| Merrick, | 1 |
| Merrimac, | 1 |
| Milford, | 1 |
| Millbury, | 1 |
| Millers Falls, | 1 |
| Millis, | 1 |
| Montague, | 2 |
| Mount Vernon, N. Y., | 1 |
| Natick, | 2 |
| Newbury, Vt., | 1 |
| Newtown, Conn., | 1 |
| North Abington, | 1 |
| North Adams, | 1 |
| North Amherst, | 3 |
| Northampton, | 1 |
| Northborough, | 1 |
| North Brookfield, | 1 |
| Northfield, | 1 |
| North Middleborough, | 1 |
| Orange, | 1 |
| Pawtucket, R. I., | 1 |
| Philadelphia, Pa., | 1 |
| Phœnix Mills, N. Y., | 1 |
| Pittsfield, | 2 |
| Plymouth, | 2 |
| Quincy, | 1 |
| Rockville, | 1 |
| Roslindale, | 1 |
| Roxbury, | 1 |
| Roxbury Station, Conn., | 1 |
| Royalston, | 1 |
| Rowe, | 1 |
| Saxonville, | 1 |
| Sayville, L. I., N. Y., | 1 |
| Seymour, Conn., | 1 |
| Shelburne Falls, | 1 |
| Somerset, | 1 |
| Somerville, | 4 |
| Southborough, | 1 |
| South Duxbury, | 1 |
| South Hadley, | 1 |
| South Hadley Falls, | 1 |
| South Harwich, | 1 |
| South Natick, | 1 |
| South Weymouth, | 1 |
| Springfield, | 3 |
| Stockbridge, | 1 |
| Stoughton, | 1 |
| Sunderland, | 2 |
| Taunton, | 1 |
| Ticonderoga, N. Y., | 1 |
| Turners Falls, | 3 |
| Vineyard Haven, | 1 |
| Waitsfield, Vt., | 1 |
| Waltham, | 2 |
| Warren, | 1 |
| Westford, | 2 |
| Westminster, | 1 |
| West Springfield, | 2 |
| Williamsburg, | 1 |
| Wilton, Conn., | 1 |
| Windsor, Conn., | 1 |
| Winter Hill, | 1 |
| Winthrop, | 2 |
| Worcester, | 7 |

*B. Home Addresses (classified by States).*

| | Number. | Per Cent. |
|---|---|---|
| Connecticut, | 5 | 2.72 |
| Maine, | 1 | .54 |
| Massachusetts, | 158 | 85.87 |
| New Hampshire, | 1 | .54 |
| New Jersey, | 3 | 1.63 |
| New York, | 8 | 4.35 |
| Pennsylvania, | 3 | 1.63 |
| Rhode Island, | 2 | 1.09 |
| Vermont, | 3 | 1.63 |
| | 184 | 100.00 |

### *C. Home Addresses (classified by Counties of Massachusetts).*

| | Number. | Per Cent. | | Number. | Per Cent. |
|---|---|---|---|---|---|
| Barnstable, | 1 | .63 | Middlesex, | 34 | 21.52 |
| Berkshire, | 9 | 5.70 | Nantucket, | – | – |
| Bristol, | 5 | 3.16 | Norfolk, | 9 | 5.70 |
| Dukes, | 1 | .63 | Plymouth, | 10 | 6.33 |
| Essex, | 16 | 10.13 | Suffolk, | 16 | 10.13 |
| Franklin, | 14 | 8.86 | Worcester, | 23 | 14.55 |
| Hampden, | 6 | 3.80 | | | |
| Hampshire, | 14 | 8.86 | | 158 | 100.00 |

### *D. Nativity of Parents.*

| | Number. | Per Cent. |
|---|---|---|
| Neither parent foreign born, | 139 | 75.55 |
| Both parents foreign born, | 32 | 17.39 |
| Father (only) foreign born, | 7 | 3.80 |
| Mother (only) foreign born, | 6 | 3.26 |
| | 184 | 100.00 |

### *E. Education of Father.*

| | Number. | Per Cent. |
|---|---|---|
| Common school, | 83 | 45.11 |
| High school, | 56 | 30.43 |
| Business school, | 19 | 10.33 |
| College or university, | 20 | 10.87 |
| No statistics, | 6 | 3.26 |
| | 184 | 100.00 |

### *F. Religious Census.*

| | MEMBERSHIP. | | PREFERENCE. | | TOTALS. | |
|---|---|---|---|---|---|---|
| | Number. | Per Cent. | Number. | Per Cent. | Number. | Per Cent. |
| Baptist, | 14 | 7.61 | 4 | 2.17 | 18 | 9.78 |
| Catholic, | 19 | 10.33 | – | – | 19 | 10.33 |
| Congregational, | 41 | 22.28 | 28 | 15.22 | 69 | 37.50 |
| Episcopal, | 10 | 5.44 | 7 | 3.80 | 17 | 9.24 |
| Hebrew, | 2 | 1.08 | 6 | 3.26 | 8 | 4.34 |
| Methodist, | 10 | 5.44 | 4 | 2.17 | 14 | 7.61 |
| Presbyterian, | 4 | 2.17 | – | – | 4 | 2.17 |
| Unitarian, | 11 | 5.98 | 5 | 2.72 | 16 | 8.70 |
| Universalist, | 1 | .54 | 9 | 4.90 | 10 | 5.44 |
| Miscellaneous, | 3 | 1.63 | – | – | 3 | 1.63 |
| No statistics, | 6 | 3.26 | – | – | 6 | 3.26 |
| | 121 | 65.76 | 63 | 34.24 | 184 | 100.00 |

### G. *Occupation of Fathers.*

| | Number. | Per Cent. |
|---|---|---|
| Agriculture and horticulture (practical), | 48 | 26.09 |
| Artisans, | 42 | 22.82 |
| Business, | 51 | 27.72 |
| Deceased or no statistics, | 10 | 5.44 |
| Miscellaneous, | 14 | 7.61 |
| Professional, | 17 | 9.24 |
| Retired, | 2 | 1.08 |
| | 184 | 100.00 |

### H. *Intended Vocations of Students.*

| | Number. | Per Cent. |
|---|---|---|
| Agriculture or horticulture (practical), | 73 | 39.67 |
| Agriculture or horticulture (professional), | 64 | 34.78 |
| Business, | 1 | .54 |
| Miscellaneous, | 1 | .54 |
| Professions, | 7 | 3.80 |
| Undecided or no statistics, | 38 | 20.65 |
| | 184 | 99.98 |

### I. *Farm Experience.*

| | Number. | Per Cent. |
|---|---|---|
| Brought up on a farm, | 56 | 30.43 |
| Not brought up on a farm and having had no, or practically no, farm experience, | 75 | 40.76 |
| Not brought up on a farm, but having had some farm experience, | 53 | 28.80 |
| | 184 | 99.99 |

### J. *Miscellaneous Statistics.*

| | |
|---|---|
| Average age, | 19.22 years. |
| Number applying for student labor, | 110 (59.23 per cent.) |

### TABLE VI. — *Entrance Statistics of Freshman Class.*

| | | | |
|---|---|---|---|
| Number of applications, | | | 288 |
| Admitted, | | 204 | |
| Matriculated, | 184 | | |
| Failed to report, | 20 | | |
| Total, | | 204 | |
| Rejected, | | 84 | |
| Total, | | | 288 |
| Admitted on certificate, | | | 128 |
| Admitted on examination, | | | 14 |
| Admitted on certificate and examination, | | | 42 |
| | | | 184 |
| Admitted without condition, | | | 113 |
| Admitted with condition, | | | 71 |
| | | | 184 |

# REPORT OF THE TREASURER

## FOR THE FISCAL YEAR ENDING NOV. 30, 1912.

### BALANCE SHEET.

| | | | DR. | CR. |
|---|---|---|---|---|
| 1911.<br>Dec. 1. | To cash on hand, | | $8,229 09 | |
| | To cash on deposit, | | 15,439 54 | |
| 1912.<br>Nov. 30. | To special appropriation receipts, State Treasurer, | | 149,782 44 | |
| | By special appropriation disbursements, | | | $143,655 88 |
| | To experiment station receipts, | | 67,643 34 | |
| | From State Treasurer, | $14,250 00 | | |
| | From United States Treasurer, | 30,000 00 | | |
| | From other sources and transfers, | 23,393 34 | | |
| | By experiment station disbursements, | | | 68,649 41 |
| | To current account receipts, | | 266,193 52 | |
| | From United States Treasurer, Morrill fund, | $16,666 66 | | |
| | From United States Treasurer, Nelson fund, | 16,666 67 | | |
| | From State Treasurer endowment fund, | 10,613 32 | | |
| | From State Treasurer, maintenance, | 58,000 00 | | |
| | From State Treasurer, administration, | 25,000 00 | | |
| | From State Treasurer, instruction, | 60,000 00 | | |
| | From State Treasurer, extension department, | 20,000 00 | | |
| | From other sources and transfers, | 59,246 87 | | |
| | By current account disbursements, | | | 275,661 69 |
| | To student trust funds receipts, | | 66,805 76 | |
| | By student trust funds disbursements, | | | 62,855 80 |
| | By cash on hand, | | | 6,852 44 |
| | By cash on deposit, | | | 16,418 47 |
| | | | $574,093 69 | $574,093 69 |

### STATEMENT OF THE FIRST NATIONAL BANK OF AMHERST WITH THE MASSACHUSETTS AGRICULTURAL COLLEGE.

| | | DR. | CR. |
|---|---|---|---|
| 1911.<br>Dec. 1. | Balance on hand, | $39,976 40[1] | |
| 1912.<br>Nov. 30. | Deposits for year, | 551,561 75 | |
| | Interest, | 1,088 69 | |
| | Disbursements as per warrants, | | $547,301 97 |
| | Balance on hand, | | 45,324 87[1] |
| | | $592,626 84 | $592,626 84 |

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[1] These amounts are greater Dec. 1, 1911, by $24,536.86, and Nov. 30, 1911, $28,791.20, on account of outstanding checks.

## SPECIAL APPROPRIATIONS.

| NAME OF APPROPRIATION. | Date made. | Amount of Appropriation. | Amount previously expended. | Amount expended during Fiscal Year. | Amount expended to Date. | Amount received from State Treasurer. | Balance on Hand with State Treasurer. |
|---|---|---|---|---|---|---|---|
| Architects' fees,[1] | – | – | $1,902 11 | $2,675 00 | $4,577 11 | – | – |
| Dairy building, | 1911 | $75,000 00 | 12,819 86 | 61,215 25 | 74,035 11 | $74,035 11 | $964 89 |
| Equipment, | 1911 | 10,000 00 | 3,355 23 | 6,644 77 | 10,000 00 | 10,000 00 | – |
| Repairs, | 1911 | 15,000 00 | 4,579 31 | 10,420 69 | 15,000 00 | 15,000 00 | – |
| Small buildings, | 1911 | 15,000 00 | 7,792 32 | 6,982 03 | 14,774 35 | 14,774 35 | 225 65 |
| West experiment station, | 1911 | 7,500 00 | 5,305 18 | 2,194 82 | 7,500 00 | 7,500 00 | – |
| Improvements, | 1912 | 10,000 00 | – | 10,000 00 | 10,000 00 | 10,000 00 | – |
| Addition to Draper Hall, | 1912 | 25,000 00 | – | 18,314 53 | 18,314 53 | 18,314 53 | 6,685 47 |
| Miscellaneous, | 1912 | 20,000 00 | – | 14,779 95 | 14,779 95 | 14,779 95 | 5,220 05 |
| Repairs, | 1912 | 15,000 00 | – | 8,128 84 | 8,128 84 | 8,128 84 | 6,871 16 |
|  | – | $192,500 00 | $35,754 01 | $141,355 88 | $177,109 89 | $172,532 78 | $19,967 22 |

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[1] No appropriation made as yet.

## CURRENT ACCOUNTS.

*Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1, 1911, to Nov. 30, 1912. | Receipts from Dec. 1, 1911, to Nov. 30, 1912. | Apportionment for Year ending Nov. 30, 1911. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $6,177 60 | $24 72 | $7,240 00 | $1,087 12 |
| Agricultural economics, | 102 11 | – | 125 00 | 22 89 |
| Agricultural education, | 1,266 84 | 122 62 | 1,100 00 | —44 22 |
| Agronomy, | 206 40 | 5 20 | 200 00 | —1 20 |
| Animal husbandry, | 264 01 | 3 89 | 300 00 | 39 88 |
| Botanical, | 1,558 75 | 970 63 | 750 00 | 161 88 |
| Chemical, | 3,958 87 | 2,648 23 | 1,400 00 | 89 36 |
| Dairying, | 205 80 | 20 | 200 00 | —5 60 |
| Dean's office, | 353 02 | 11 00 | 300 00 | —42 02 |
| Economics and sociology, | 48 35 | – | 100 00 | 51 65 |
| Entomology, | 1,359 83 | 263 99 | 1,200 00 | 104 16 |
| Farm, | 26,207 33 | 19,919 02 | 3,000 00 | —3,288 31 |
| Farm administration, | 212 66 | 11 38 | 200 00 | —1 28 |
| Floriculture, | 3,887 99 | 2,869 75 | 1,300 00 | 281 76 |
| Forestry, | 184 57 | – | 400 00 | 215 43 |
| General agriculture, | 537 28 | 51 63 | 200 00 | —285 65 |
| General horticulture, | 2,791 01 | 599 54 | 2,000 00 | —191 47 |
| General maintenance, | 63,093 90 | 22,094 07 | 46,500 00 | 5,500 17 |
| Graduate school, | 1 50 | – | – | 2,366 13 |
| Grounds, | 3,114 11 | 85 | 3,500 00 | 386 74 |
| History and government, | 19 93 | – | 100 00 | 80 07 |
| Landscape gardening, | 444 55 | 473 03 | 250 00 | 278 48 |
| Language and literature, | 544 37 | – | 750 00 | 205 63 |
| Library, | 6,591 12 | 590 40 | 6,000 00 | — 72 |
| Market gardening, | 4,452 21 | 1,851 94 | 2,400 00 | —200 27 |
| Mathematics, | 209 81 | – | 350 00 | 140 19 |
| Military, | 1,547 43 | – | 1,550 00 | 2 57 |
| Physics, | 227 94 | – | 525 00 | 297 06 |
| Physical education, | 570 99 | 121 50 | 500 00 | 50 51 |
| Pomology, | 3,502 47 | 1,233 52 | 2,000 00 | —268 95 |
| Poultry husbandry, | 3,214 79 | 1,235 41 | 2,000 00 | 20 62 |
| President's office, | 659 08 | 2 18 | 1,000 00 | 343 10 |
| Registrar's office, | 383 00 | 60 | 400 00 | 17 60 |
| Rural sociology, | 39 69 | – | 100 00 | 60 31 |
| Salaries, | 113,525 51 | – | 110,593 34 | —2,932 17 |
| Treasurer's office, | 891 20 | 6 88 | 800 00 | —84 32 |
| Veterinary department, | 1,464 03 | 19 35 | 1,400 00 | —44 68 |
| Zoölogy, | 571 58 | 329 69 | 150 00 | —91 89 |
| State Treasurer: — | | | | |
| Endowment fund, | – | 10,613 32 | – | – |
| Maintenance, | – | 58,000 00 | – | – |
| Scholarship, | – | 25,000 00 | – | – |
| Instruction, | – | 60,000 00 | – | – |
| United States Treasurer: — | | | | |
| Morrill fund, | – | 16,666 66 | – | – |
| Nelson fund, | – | 16,666 67 | – | – |
| | $254,391 63 | $242,407 87 | $200,883 34 | $11,803 31 |
| Balance beginning fiscal year Dec. 1, 1911, | – | 31,272 38[1] | – | —7,482 75 |
| Balance on hand Nov. 30, 1912, | 19,288 62 | – | – | – |
| | $273,680 25 | $273,680 25 | $200,883 34 | $4,320 56 |

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[1] This balance is increased by $5,411.94 on account of extension service deficit, shown in report of that department.

## *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| Cash on hand Dec. 1, 1911,[1] | – | $31,236 57 |
| Institution receipts Nov. 30, 1912, | – | 55,461 22 |
| State Treasurer's receipts Nov. 30, 1912, | – | 153,613 32 |
| United States Treasurer's receipts Nov. 30, 1912, | – | 33,333 33 |
| Total disbursements, | $254,391 63 | – |
| | $254,391 63 | $273,644 44 |
| Bills receivable Dec. 1, 1911, deducted, | – | 2,265 82 |
| Bills payable Dec. 1, 1911, deducted, | 3,059 45 | – |
| | $251,332 18 | $271,378 62 |
| Bills receivable Nov. 30, 1912, | – | 4,058 51 |
| Bills payable Nov. 30, 1912, | 2,964 94 | – |
| Balance, | 21,140 01 | – |
| | $275,437 13 | $275,437 13 |

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[1] This amount is greater by $5,411.94 than previous report on account of taking out deficit of the extension service. See the extension service report.

## *Comparative Disbursements and Receipts for 1911–12.*

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1911. | 1912. | 1911. | 1912. |
| Administration, | $6,233 96 | $6,177 60 | $2 36 | $24 72 |
| Agricultural economics, | 91 28 | 102 11 | – | – |
| Agricultural education, | 5,705 78 | 1,266 84 | 17 67 | 122 52 |
| Agricultural division, | 22,788 40 | 26,207 33 | 19,052 37 | 19,919 02 |
| Agronomy, | – | 206 40 | – | 5 20 |
| Animal husbandry, | – | 264 01 | – | 3 89 |
| Botanical, | 1,442 56 | 1,558 75 | 769 55 | 970 63 |
| Chemical, | 3,520 50 | 3,958 87 | 2,328 43 | 2,648 23 |
| Dairying, | – | 205 80 | – | 20 |
| Dean's office, | 202 45 | 353 02 | – | 11 00 |
| Economics and sociology, | – | 48 35 | – | – |
| Entomology, | 1,084 82 | 1,359 83 | 275 79 | 263 99 |
| Extension service, | 20,811 41 | – | 2,864 87 | – |
| Farm administration, | – | 212 66 | – | 11 38 |
| Floriculture, | 3,499 93 | 3,887 99 | 2,761 82 | 2,869 75 |
| Forestry, | 392 77 | 184 57 | 50 | – |
| General agriculture, | – | 537 28 | – | 51 63 |
| General horticulture, | 2,585 00 | 2,791 01 | 659 80 | 599 54 |
| General maintenance, | 39,136 73 | 63,093 90 | 10,573 42 | 22,094 07 |
| Graduate school, | 1,339 18 | 1 50 | 120 00 | – |
| Grounds, | 1,900 61 | 3,114 11 | 1 70 | 85 |
| History and government, | – | 19 93 | – | – |
| Landscape gardening, | 433 72 | 444 55 | 256 93 | 473 03 |
| Language and literature, | 598 99 | 544 37 | – | – |
| Library, | 5,542 46 | 6,591 12 | 436 91 | 590 40 |
| Market gardening, | 4,413 12 | 4,452 21 | 2,293 74 | 1,851 94 |
| Mathematics, | 361 75 | 209 81 | 10 | – |
| Military, | 1,939 42 | 1,547 43 | 24 79 | – |
| Physics, | – | 227 94 | – | – |
| Physical education, | 497 60 | 570 99 | 119 00 | 121 50 |
| Political science, | 85 07 | – | – | – |
| Pomology, | 3,425 41 | 3,502 47 | 1,156 58 | 1,233 52 |
| Poultry husbandry, | – | 3,214 79 | – | 1,235 41 |
| President's office, | 873 68 | 659 08 | 28 44 | 2 18 |
| Registrar's office, | 302 13 | 383 00 | – | 60 |
| Rural sociology, | – | 39 69 | – | – |
| Salaries, | 84,132 15 | 113,525 51 | – | – |
| Treasurer's office, | 764 18 | 891 20 | – | 6 88 |
| Veterinary, | 1,343 35 | 1,464 03 | 17 50 | 19 35 |
| Zoölogy, | 493 40 | 571 58 | 346 30 | 329 69 |

*Comparative Disbursements and Receipts* — Concluded.

| ACCOUNTS. | DISBURSEMENTS. | | RECEIPTS. | |
|---|---|---|---|---|
| | 1911. | 1912. | 1911. | 1912. |
| State Treasurer: — | | | | |
| Endowment fund, | – | – | $10,613 32 | $10,613 32 |
| Maintenance, | – | – | 35,000 00 | 58,000 00 |
| Scholarship, | – | – | 15,000 00 | 25,000 00 |
| Instruction, | – | – | 47,500 00 | 60,000 00 |
| Extension service, | – | – | – | – |
| Agricultural education, | – | – | 5,000 00 | – |
| Veterinary, | – | – | 1,000 00 | – |
| Student labor, | – | – | 7,500 00 | – |
| Graduate school, | – | – | 2,500 00 | – |
| United States Treasurer: — | | | | |
| Morrill fund, | – | – | 16,666 66 | 16,666 66 |
| Nelson fund, | – | – | 16,666 67 | 16,666 67 |
| | $215,941 81 | $254,391 63 | $201,555 22 | $242,407 87 |
| Balance beginning fiscal year, | – | – | 25,211 22 | 31,272 38[1] |
| Balance at close of fiscal year, | 25,824 63 | 19,288 62 | – | – |
| | $241,766 44 | $273,680 25 | $226,766 44 | $273,680 25 |

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[1] In closing accounts the balance of $35.81, Old Creamery House, was used to close up current accounts.

## EXPERIMENT STATION.

*Disbursements and Receipts.*

| ACCOUNTS. | Disbursements from Dec. 1, 1911, to Nov. 30, 1912. | Receipts from Dec. 1, 1911, to Nov. 30, 1912. | Apportionment for Year ending Nov. 30, 1912. | Balance to Credit. |
|---|---|---|---|---|
| Administration, | $1,690 19 | $2 94 | $1,800 00 | $112 75 |
| Agricultural, | 4,469 62 | 1,920 80 | 2,100 00 | —449 02 |
| Asparagus, | 733 84 | – | 500 00 | —233 84 |
| Botanical, | 1,127 23 | 6 17 | 1,500 00 | 378 94 |
| Chemical, | 9,397 06 | 8,980 25 | 2,900 00 | 2,483 19 |
| Cranberry, | 3,228 96 | 2,337 89 | 3,000 00 | 2,108 93 |
| Entomological, | 466 03 | – | 700 00 | 233 97 |
| Fertilizer, | – | – | – | – |
| Freight, | 275 76 | 80 | 300 00 | 25 04 |
| Feed law, | 4,345 00 | 3,750 00 | 3,750 00 | 1,081 45 |
| Graves orchard, | 676 33 | 30 00 | 300 00 | —346 33 |
| Horticultural, | 1,539 15 | 50 | 1,350 00 | —188 65 |
| Library, | 89 48 | – | 300 00 | 210 52 |
| Meteorology, | 397 05 | – | 400 00 | 2 95 |
| Publications, | 1,263 53 | – | 2,400 00 | 1,136 47 |
| Salaries, | 29,640 69 | – | 37,500 00 | 7,859 31 |
| Treasurer's office, | 253 18 | – | 350 00 | 96 82 |
| Veterinary, | 275 16 | 113 00 | 250 00 | 87 84 |
| Hatch fund, | – | 15,000 00 | – | – |
| Adams fund, | – | 15,000 00 | – | – |
| State fund, | – | 10,500 00 | – | – |
| Poultry, | 247 55 | – | 250 00 | 2 45 |
| Fertilizer law, | 8,533 60 | 10,000 99 | – | 1,467 39 |
| | $68,649 41 | $67,643 34 | $59,650 00 | $17,288 02 |
| Balance beginning fiscal year, Dec. 1, 1911, | – | 4,090 36 | – | —1,217 84 |
| Balance on hand Nov. 30, 1912, | 3,084 29 | – | – | – |
| | $71,733 70 | $71,733 70 | $59,650 00 | $16,070 18 |

## *Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| Cash on hand Dec. 1, 1911, | – | $4,090 36 |
| Receipts from State Treasurer, | – | 14,250 00 |
| Receipts from United States Treasurer, | – | 30,000 00 |
| Receipts from other sources, | – | 23,393 34 |
| Total disbursements, | $68,649 41 | – |
| | $68,649 41 | $71,733 70 |
| Bills receivable Nov. 30, 1912, | – | 2,394 95 |
| Bills payable Nov. 30, 1912, | 505 53 | – |
| Balance, | 4,973 71 | – |
| | $74,128 65 | $74,128 65 |

## *Comparative Disbursements and Receipts for 1911–12.*

| Accounts. | Disbursements. | | Receipts. | |
|---|---|---|---|---|
| | **1911.** | **1912.** | **1911.** | **1912.** |
| Administration, | $1,669 79 | $1,690 19 | $123 79 | $2 94 |
| Agriculture, | 4,864 07 | 4,469 62 | 2,128 14 | 1,920 80 |
| Asparagus, | 748 63 | 733 84 | – | – |
| Botanical, | 1,577 35 | 1,127 23 | 20 82 | 6 17 |
| Chemical, | 9,809 16 | 9,397 06 | 7,165 66 | 8,980 25 |
| Cranberry, | 4,038 98 | 3,228 96 | 4,232 00 | 2,337 89 |
| Entomology, | 588 10 | 466 03 | 2 50 | – |
| Fertilizer, | –[1] | 8,533 60 | 6,094 83 | 10,000 99 |
| Freight, | 294 49 | 275 76 | – | 80 |
| Feed law, | 2,891 44 | 4,345 00 | 3,000 00 | 3,750 00 |
| Graves orchard, | 194 79 | 676 33 | – | 30 00 |
| Horticulture, | 1,439 97 | 1,539 15 | 4 36 | 50 |
| Library, | 161 56 | 89 48 | – | – |
| Meteorology, | 322 16 | 397 05 | – | – |
| Publications, | 1,726 40 | 1,263 53 | – | – |
| Salaries, | 33,899 31 | 29,640 69 | – | – |
| Treasurer's office, | 182 12 | 253 18 | – | – |
| Veterinary, | 238 16 | 275 16 | 5 00 | 113 00 |
| Hatch fund, | – | – | 15,000 00 | 15,000 00 |
| Adams fund, | – | – | 15,000 00 | 15,000 00 |
| State fund, | – | – | 10,500 00 | 10,500 00 |
| Poultry, | – | 247 55 | – | – |
| Tobacco experiments, | 340 20 | – | – | – |
| | $64,986 68 | $68,649 41 | $63,277 10 | $67,643 34 |
| Balance beginning fiscal year, | – | – | 5,799 94 | 4,090 36 |
| Balance on hand Nov. 30, 1912, | 4,090 36 | 3,084 29 | – | – |
| | $69,077 04 | $71,733 70 | $69,077 04 | $71,733 70 |

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[1] Disbursements were included under plant and animal chemistry.

## EXTENSION SERVICE.

*Disbursements and Receipts.*

| | Disbursements. | Receipts. | Apportionment. | Balance. |
|---|---|---|---|---|
| Miscellaneous, | – | – | $980 00 | $980 00 |
| From State Treasurer, | – | $20,000 00 | – | – |
| Administration, | $14,459 53 | 462 92 | 13,320 00 | —676 61 |
| Correspondence courses, | 840 65 | 616 39 | 1,000 00 | 775 74 |
| Itinerant instruction, | 310 79 | 55 59 | 200 00 | —55 20 |
| Demonstration orchards, | 468 84 | 12 06 | 600 00 | 143 22 |
| Dairy improvement, | 377 71 | 93 78 | 600 00 | 316 07 |
| Boys' and Girls' Club, | 164 39 | 12 06 | – | —152 33 |
| M. A. C. Improvement Association, | 161 64 | 33 78 | 200 00 | 72 14 |
| Winter school, | 2,108 38 | 1,901 64 | 1,500 00 | 1,293 26 |
| Poultry convention, | 124 66 | – | 300 00 | 175 34 |
| Farmers' week, | 693 83 | 23 11 | 500 00 | —170 72 |
| Beekeepers' course, | 151 61 | – | 200 00 | 48 39 |
| Packing school, | 463 89 | 528 70 | – | 64 81 |
| Summer school, | 6 40 | 43 12 | – | 36 72 |
| Conference Rural Social workers, | 511 85 | 2 50 | – | —509 35 |
| District field agent, | 425 89 | – | 600 00 | 174 11 |
| | $21,270 06 | $23,785 65 | $20,000 00 | $4,079 80 |
| Balance Dec. 1, 1911, | 5,411 94 | – | – | —1,564 21 |
| Balance Nov. 30, 1912, | – | 2,896 35 | – | – |
| | $26,682 00 | $26,682 00 | $20,000 00 | $2,515 59 |

*Summary.*

| | Disbursements. | Receipts. |
|---|---|---|
| Overdraft, Dec. 1, 1911, | $5,411 94 | $3,785 65 |
| Receipts, Nov. 30, 1912, | – | – |
| Receipts from State Treasurer, | – | 20,000 00 |
| Disbursements, Nov. 30, 1912, | 21,270 06 | – |
| | $26,682 00 | $23,785 65 |
| Bills payable Dec. 1, 1911, deducted, | 431 92 | – |
| | $26,250 08 | $23,785 65 |
| Bills receivable Nov. 30, 1912, | – | 101 37 |
| Bills payable Nov. 30, 1912, | 916 95 | – |
| Balance overdrawn Nov. 30, 1912, | – | 3,280 01 |
| | $27,167 03 | $27,167 03 |

## AGRICULTURAL DIVISION.

*Disbursements and Receipts.*

| | Disbursements. | Receipts. |
|---|---|---|
| Agronomy, | $206 40 | $5 20 |
| Animal husbandry, | 264 01 | 3 89 |
| Dairying, | 205 80 | 20 |
| Farm administration, | 212 66 | 11 38 |
| General agriculture, | 537 28 | 51 63 |
| Poultry husbandry, | 3,214 79 | 1,235 41 |
| Farm, | 26,207 33 | 19,919 02 |
| Division totals, | $30,848 27 | $21,226 73 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | | $21,226 73 |
| By bills receivable, | | 2,930 15 |
| By net apportionment, | | 6,100 00 |
| To total disbursements, | $30,848 27 | |
| To bills payable, | 294 16 | |
| To balance, | . . . | 885 55 |
| | $31,142 43 | $31,142 43 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1911. | Nov. 30, 1912. |
|---|---|---|
| Inventory of produce, | $4,728 73 | $7,010 93 |
| Inventory of cattle, | 10,823 00 | 11,148 00 |
| Inventory of swine, | 485 00 | 731 00 |
| Inventory of horses, | 4,080 00 | 4,090 00 |
| Inventory of poultry, | 614 25 | 1,524 15 |
| Inventory of sheep, | – | 200 00 |
| | $20,730 98 | $24,704 08 |

## Horticultural Division.

### *Disbursements and Receipts.*

| | Disbursements. | Receipts. |
|---|---|---|
| Floriculture, | $3,887 99 | $2,869 75 |
| Forestry, | 184 57 | – |
| General horticulture, | 2,791 01 | 599 54 |
| Grounds, | 3,114 11 | 85 |
| Landscape gardening, | 444 55 | 473 03 |
| Market gardening, | 4,452 21 | 1,851 94 |
| Pomology, | 3,502 47 | 1,233 52 |
| | $18,376 91 | $7,028 63 |

### *Summary.*

| | Dr. | Cr. |
|---|---|---|
| By total division receipts, | | $7,028 63 |
| By bills receivable, | | 888 65 |
| By apportionment, | | 11,850 00 |
| To total division disbursements, | $18,376 91 | |
| To bills payable, | 356 81 | |
| To balance, | 1,033 56 | |
| | $19,767 28 | $19,767 28 |

### *Inventory of Quick Assets.*

| | Nov. 30, 1911. | Nov. 30, 1912. |
|---|---|---|
| Inventory of supplies, | $1,064 00 | $621 25 |

## INVENTORY — REAL ESTATE.

### *Land (Estimated Value).*

| | |
|---|---|
| Baker place, | $2,500 00 |
| Bangs place, | 2,350 00 |
| Clark place, | 4,500 00 |
| College farm, | 37,000 00 |
| Cranberry land, | 11,063 00 |
| Harlow farm, | 3,284 63 |
| Kellogg farm, | 5,868 45 |
| Louisa Baker place, | 5,636 91 |
| Old creamery place, | 1,000 00 |
| Pelham quarry, | 500 00 |
| Westcott place, | 2,250 00 |
| Allen place, | 500 00 |
| Charmbury place, | 450 00 |
| Loomis place, | 415 00 |
| Hawley & Brown place, | 675 00 |
| Newell farm, | 2,800 00 |
| | $80,792 99 |

### *College Buildings (Estimated Value).*

| | |
|---|---|
| Apiary, | $3,000 00 |
| Animal husbandry building, | 10,000 00 |
| Chemical laboratory, | 8,000 00 |
| Clark hall, | 67,500 00 |
| Cold storage laboratory, | 12,000 00 |
| Dairy building, | 75,000 00 |
| Dairy barn and storage, | 30,000 00 |
| Dining hall, | 35,000 00 |
| Drill hall and gun shed, | 10,000 00 |
| Durfee range and glass houses, old, | 10,000 00 |
| Durfee range and glass houses, new, | 15,000 00 |
| Entomology building, | 80,000 00 |
| Farmhouse, | 2,500 00 |
| French hall, | 17,000 00 |
| Horse barn, | 5,000 00 |
| Horticultural barn, | 2,500 00 |
| Horticultural tool shed, | 2,000 00 |
| Machinery barn, | 4,000 00 |
| Mathematical building, | 6,000 00 |
| North dormitory, | 25,000 00 |
| Physics laboratory, | 5,500 00 |
| Poultry breeding house, | 600 00 |
| Poultry brooder house, | 1,000 00 |
| Poultry incubator cellar and demonstration building, | 1,400 00 |
| Poultry laboratory, | 1,300 00 |
| Poultry laying house, | 1,800 00 |
| Poultry mechanics and storage building, | 1,900 00 |
| Power plant and storage building, | 18,500 00 |
| President's house, | 12,000 00 |
| Quarantine barn, | 200 00 |
| Sheep shed, | 1,400 00 |
| Small plant house, with vegetable cellar and cold grapery, | 4,700 00 |

### *College Buildings (Estimated Value)* — Concluded.

| | |
|---|---|
| South dormitory, | $35,000 00 |
| Stone chapel, | 30,000 00 |
| Three houses on Stockbridge Road, | 5,000 00 |
| Veterinary laboratory and stable, | 23,500 00 |
| Waiting station, | 500 00 |
| Wilder hall, | 37,500 00 |
| Young stock barn, | 6,500 00 |
| | $607,800 00 |

### *College Equipment (Estimated Value).*

| | |
|---|---|
| Administrative division: — | |
| Dean's office, | $212 20 |
| President's office, | 952 40 |
| Registrar's office, | 263 25 |
| Treasurer's office, | 2,360 00 |
| Agricultural division: — | |
| Agronomy, | 1,737 53 |
| Animal husbandry, | 1,173 67 |
| Dairy, | 7,545 64 |
| Farm administration, | 1,278 49 |
| Farm department, | 29,749 69 |
| Poultry, | 3,321 63 |
| Dining hall, | 4,447 50 |
| Extension department, | 1,659 35 |
| General maintenance: — | |
| College supplies, | 217 82 |
| Fire apparatus, | 1,332 32 |
| General maintenance, | 70,890 03 |
| Janitor supplies, | 253 83 |
| Water mains, | 8,350 00 |
| General science: — | |
| Apiary, | 1,145 67 |
| Botanical, | 7,991 17 |
| Chemical, | 10,642 63 |
| Entomology, | 5,921 89 |
| Microbiology, | 2,000 00 |
| Mathematics, | 3,312 50 |
| Physics, | 2,559 50 |
| Veterinary, | 8,390 62 |
| Zoölogical laboratory, | 8,945 53 |
| Zoölogical museum, | 6,411 93 |
| History and political science, | 20 75 |
| Horticultural division: — | |
| Floriculture, | 6,926 66 |
| Forestry, | 1,318 64 |
| General horticulture, | 9,715 28 |
| Grounds, | 248 12 |
| Landscape gardening, | 4,575 78 |
| Market gardening, | 1,383 49 |
| Pomology, | 2,947 71 |
| Humanities, division of: — | |
| Economics and sociology, | 93 00 |
| Language and literature, | 279 85 |

### *College Equipment (Estimated Value)* — Concluded.

| | |
|---|---|
| Library, | $67,573 35 |
| Military, | 1,264 42 |
| Physical education, | 2,263 12 |
| Rural social science: — | |
| Agricultural economics, | 237 25 |
| Agricultural education, | 716 39 |
| Rural social service, | 90 35 |
| Textbooks, | 518 55 |
| Trophy room, | 1,504 80 |
| | $294,744 30 |

### *Experiment Station Buildings (Estimated Value).*

| | |
|---|---|
| Agricultural laboratory, | $15,000 00 |
| Agricultural barns, | 5,000 00 |
| Agricultural farmhouse, | 1,500 00 |
| Agricultural glass house, | 500 00 |
| Cranberry buildings, | 2,720 00 |
| Plant and animal chemistry laboratory, | 30,000 00 |
| Plant and animal chemistry barns, | 4,000 00 |
| Plant and animal chemistry dairy, | 2,000 00 |
| Six poultry houses, | 600 00 |
| Entomological laboratory and glass house, | 850 00 |
| | $62,170 00 |

### *Experiment Station Equipment (Estimated Value).*

| | |
|---|---|
| Agricultural laboratory, | $6,392 02 |
| Botanical laboratory, | 5,101 20 |
| Chemical laboratory, | 16,672 04 |
| Cranberry station, | 2,167 49 |
| Director's office, | 3,954 75 |
| Entomological laboratory, | 23,242 50 |
| Horticultural laboratory, | 1,762 00 |
| Library, | 320 00 |
| Meteorology laboratory, | 1,087 00 |
| Poultry department, | 543 35 |
| Treasurer's office, | 381 40 |
| Veterinary laboratory, | 121 94 |
| | $61,745 69 |

### *Inventory Summary.*

| | |
|---|---|
| Land, | $80,792 99 |
| College buildings, | 607,800 00 |
| College equipment, | 294,744 30 |
| Experiment station buildings, | 62,170 00 |
| Experiment station equipment, | 61,745 69 |
| | $1,107,252 98 |

## STUDENTS' TRUST FUND ACCOUNTS.

| | Disbursements for Year ending Nov. 30, 1912. | Receipts for Year ending Nov. 30, 1912. | Balance on Hand Nov. 30, 1912. | Balance brought forward Dec. 1, 1911. |
|---|---|---|---|---|
| Athletics, | $8,217 80 | $7,430 50 | $2,749 35 | $3,536 65 |
| Draper Hall, | 38,835 04 | 39,783 05 | —742 79 | —1,690 80 |
| "College signal," | 1,913 81 | 1,972 48 | 608 83 | 550 16 |
| Keys, | 15 00 | 16 25 | 31 75 | 30 50 |
| Harlow farm, | 96 45 | 120 00 | —141 08 | 164 63 |
| Student deposits, | 5,792 67 | 7,119 86 | 1,881 74 | 554 55 |
| Kellogg farm, | 152 78 | 141 66 | 24 57 | 35 69 |
| Trophy room tax, | 945 56 | 959 91 | 622 92 | 608 57 |
| 1914 index, | 94 03 | 119 00 | 24 97 | – |
| Textbooks, | 4,766 89 | 4,811 78 | 426 93 | 382 04 |
| 1913 index, | 1,422 18 | 1,357 42 | 28 42 | 93 18 |
| 1912 index, | 68 52 | 44 75 | – | 23 77 |
| Kappa Sigma House, | 47 70 | 47 70 | – | – |
| Uniforms, | 487 37 | 2,281 40 | 2,633 65 | 239 62 |
| | $62,855 80 | $66,805 76 | $9,033 13 | $6,054 73 |

## DETAILED STATEMENT OF THE DINING HALL.

| | Liabilities. | Resources. |
|---|---|---|
| Dec. 1, 1911, overdraft, | $1,690 80 | – |
| Nov. 30, 1912, total disbursements, | 38,709 75 | – |
| Nov. 30, 1913, outstanding bills, | 703 56 | – |
| Nov. 30, 1912, total collections, | – | $39,393 55 |
| Nov. 30, 1912, total collections outstanding, | – | 1,018 11 |
| Nov. 30, 1912, inventory, | – | 1,757 50 |
| Nov. 30, 1912, balance, | 1,065 05 | – |
| | $42,169 16 | $42,169 16 |

## ENDOWMENT FUND.[1]

| | Principal. | Income. |
|---|---|---|
| United States grant (5 per cent.), | $219,000 00 | $7,300 00 |
| Commonwealth grant (3½ per cent.), | 142,000 00 | 3,313 32 |
| | | $10,613 32 |

---

[1] This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

## BENEFICIARY FUNDS.

### *Burnham Emergency Fund.*

| | Market Value Dec. 1, 1912. | Par Value. | Income. |
|---|---|---|---|
| Two bonds American Telephone and Telegraph Company 4s, at $890, | $1,780 00 | $2,000 00 | $80 00 |
| Two bonds Western Electric Company 5s, at $1,010, | 2,020 00 | 2,000 00 | 100 00 |
| Unexpended balance Dec. 1, 1911, | – | – | 600 55 |
| | $3,800 00 | $4,000 00 | $780 55 |
| To amount paid for C. A. Goessmann library, | – | – | 1,000 00 |
| Overdraft Dec. 1, 1912, | – | – | $219 45 |

### *Library Fund.*

| | | | |
|---|---|---|---|
| Five bonds New York Central & Hudson River Railroad Company 4s, at $920, | $4,600 00 | $5,000 00 | $200 00 |
| Five bonds Lake Shore & Michigan Southern Railroad Company 4s, at $930, | 4,650 00 | 5,000 00 | 200 00 |
| Two shares New York Central & Hudson River Railroad Company stock, at $108, | 216 00 | 200 00 | 10 50 |
| Amherst Savings Bank, deposit, | 167 77 | 167 77 | 6 18 |
| | $9,633 77 | $10,367 77 | $416 68 |
| Transferred to college library account, | – | – | 416 68 |

## SPECIAL FUNDS.

### *Endowed Labor Fund (the Gift of a Friend of the College).*

| | | | |
|---|---|---|---|
| Two bonds American Telephone and Telegraph Company 4s, at $890, | $1,780 00 | $2,000 00 | $80 00 |
| Two bonds Lake Shore & Michigan Southern Railroad Company 4s, at $930, | 1,860 00 | 2,000 00 | 80 00 |
| One bond New York Central Railroad debenture 4s, | 920 00 | 1,000 00 | 40 00 |
| Amherst Savings Bank, deposit, | 143 39 | 143 39 | 5 72 |
| One bond Metropolitan Street Railway, Kansas City Company 5s, at | 990 00 | 1,000 00 | 50 00 |
| | $5,693 39 | $6,143 39 | $255 72 |
| Unexpended balance Dec. 1, 1911, | – | – | 247 39 |
| Cash on hand Dec. 1, 1912, | – | – | $503 11 |

### *Whiting Street Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central debenture 4s, | $920 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, | 271 64 | 271 64 | 10 84 |
| | $1,191 64 | $1,271 64 | $50 84 |
| Unexpended balance Dec. 1, 1911, | – | – | 18 47 |
| | – | – | $69 31 |
| Disbursements for scholarships for fiscal year ending Nov. 30, 1912, | – | – | 23 00 |
| Cash on hand Dec. 1, 1912, | – | – | $46 31 |

## *Hills Fund.*

| | Market Value Dec. 1, 1912. | Par Value. | Income. |
|---|---|---|---|
| Northampton Institution for Savings, deposit, | $1,180 00 | $1,180 00 | $20 65 |
| One bond American Telephone and Telegraph Company 4s, | 890 00 | 1,000 00 | 40 00 |
| One bond New York Central & Hudson River Railroad debenture 4s, | 920 00 | 1,000 00 | 40 00 |
| One bond New York Central & Hudson River Railroad debenture 3½s, | 800 00 | 1,000 00 | 35 00 |
| Two bonds Metropolitan Street Railway of Kansas City 5s, at $990, | 1,980 00 | 2,000 00 | 100 00 |
| Three bonds Pacific Telephone and Telegraph Company 5s, at $990, | 2,970 00 | 3,000 00 | 150 00 |
| One bond Western Electric Company 5s, | 1,010 00 | 1,000 00 | 50 00 |
| Boston & Albany Railroad stocks, 3⅝ shares at $213, | 772 12 | 362 00 | 31 68 |
| Amherst Savings Bank, deposit, | 72 75 | 72 75 | 2 88 |
| Electric Securities Company stocks, ⁹⁄₅₀ shares at $1,000, | 1,180 00 | 1,180 00 | 29 50 |
| | $10,594 87 | $10,614 75 | $499 71 |
| Less overdraft Dec. 1, 1911, | – | – | 170 55 |
| | – | – | $329 16 |
| On April 17, 1912:<br>We withdrew our deposit from the Northampton Institution for Savings and invested it with the Mary Robinson portion of funds in the purchase of two bonds of the Electric Securities Company of New York at par, $1,180 00 | | | |
| Disbursements by floriculture and botanical departments for fiscal year ending Nov. 30, 1912, | – | – | 216 58 |
| Cash on hand Dec. 1, 1912, | – | – | $112 58 |

## *Mary Robinson Fund.*

| | | | |
|---|---|---|---|
| Northampton Institution for Savings, | $820 00 | $820 00 | $14 35 |
| Boston & Albany Railroad stock, ⅜ share at $213, | 79 86 | 38 00 | 3 32 |
| Electric Securities Company stocks, ⁴¹⁄₅₀ share at $1,000, | 820 00 | 820 00 | 20 50 |
| | $899 86 | $858 00 | $38 17 |
| Unexpended balance Dec. 1, 1910, | – | – | 89 89 |
| | – | – | $128 06 |
| On April 17, 1912: —<br>We withdrew our deposit from the Northampton Institution for Savings and invested it with a portion of the Hills fund in the purchase of two bonds of the Electric Securities Company of New York at par, $820 00 | | | |
| Disbursements for fiscal year ending Nov. 30, 1912, | – | – | 28 66 |
| Cash on hand Dec. 1, 1912, | – | – | $99 40 |

## *Grinnell Prize Fund.*

| | | | |
|---|---|---|---|
| Ten shares New York Central & Hudson River Railroad stock at $108, | $1,080 00 | $1,000 00 | $50 00 |
| Unexpended balance Dec. 1, 1911, | – | – | 195 74 |
| | $1,080 00 | $1,000 00 | $245 74 |
| Disbursements for prizes, | – | – | 50 00 |
| Cash on hand Dec. 1, 1912, | – | – | $195 74 |

## *Massachusetts Agricultural College (Investment).*

| | Market Value Dec. 1, 1912. | Par Value. | Income. |
|---|---|---|---|
| One share New York Central & Hudson River Railroad stock, | $108 00 | $100 00 | $5 00 |
| Unexpended balance Dec. 1, 1911, | – | – | 55 45 |
| Cash on hand Dec. 1, 1912, | – | – | $60 45 |

## *Gassett Scholarship Fund.*

| | | | |
|---|---|---|---|
| One bond New York Central & Hudson River Railroad debenture 4s, | $920 00 | $1,000 00 | $40 00 |
| Amherst Savings Bank, deposit, | 11 64 | 11 64 | 44 |
| | $931 64 | $1,011 64 | $40 44 |
| Unexpended balance Dec. 1, 1911, | – | – | 10 51 |
| | – | – | $50 95 |
| Disbursements for scholarships for fiscal year ending Nov. 30, 1912, | – | – | 20 00 |
| Cash on hand Dec. 1, 1912, | – | – | $30 95 |

## *Danforth Keyes Bangs Fund.*

| | | | |
|---|---|---|---|
| Two bonds Pacific Telephone and Telegraph Company 5s, at $990, | $1,980 00 | $2,000 00 | $100 00 |
| Two bonds Union Electric Light and Power Company 5s, at $990, | 1,980 00 | 2,000 00 | 100 00 |
| Two bonds American Telephone and Telegraph Company 4s, at $890, | 1,780 00 | 2,000 00 | 80 00 |
| Interest from student loans, | – | – | 10 45 |
| | $5,740 00 | $6,000 00 | $290 45 |
| Unexpended balance Dec. 1, 1911, | – | – | 531 57 |
| | – | – | $822 02 |
| Net loans to students during year, | – | – | 420 00 |
| Cash on hand Dec. 1, 1912, | – | – | $402 02 |

## *John C. Cutter Fund.*

| | | | |
|---|---|---|---|
| One bond Pacific Telephone and Telegraph Company 5s, | $990 00 | $1,000 00 | $50 00 |
| Unexpended balance Dec. 1, 1911, | – | – | 78 33 |
| | – | – | $128 33 |
| Disbursements for fiscal year to date, | – | – | 53 61 |
| Cash on hand Dec. 1, 1912, | – | – | $74 72 |

## SUMMARY OF BALANCES ON HAND OF THE INCOME FROM FUNDS HELD IN TRUST BY THE MASSACHUSETTS AGRICULTURAL COLLEGE.

| | |
|---|---|
| Hills fund, | $112 58 |
| Endowed labor fund, | 503 11 |
| Whiting Street scholarship fund, | 46 31 |
| Mary Robinson fund, | 99 40 |
| Grinnell prize fund, | 195 74 |
| Gassett scholarship fund, | 30 95 |
| Massachusetts Agricultural College investment, | 60 45 |
| Danforth Keyes Bangs fund, | 402 02 |
| John C. Cutter fund, | 74 72 |
| | $1,525 28 |
| Burnham emergency fund overdraft, | 219 45 |
| | $1,305 83 |

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the treasurer, Fred C. Kenney, for the year ending Nov. 30, 1912. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHAS. A. GLEASON,
*Auditor.*

AMHERST, Dec. 23, 1912.

## HISTORY OF SPECIAL FUNDS.

| | |
|---|---|
| Burnham emergency fund: — | |
| A bequest of $5,000 from T. O. H. P. Burnham of Boston, made without any conditions. The trustees of the college directed that $1,000 of this fund should be used in the purchase of the Newell land and Goessmann library. The fund now shows an investment of | $4,000 00 |
| Library fund: — | |
| The library of the college at the present time contains about 38,000 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave $2,000; Jan. 1, 1894, Charles L. Flint gave $1,000; in 1887 Elizur Smith of Lee, Mass., gave $1,215. These were the largest bequests, and amount now to | 10,000 00 |
| Endowed labor fund: — | |
| Gift of a friend of the college in 1901, income of which is to be used for the assistance of needy and deserving students, | 5,000 00 |

| | |
|---|---|
| Whiting Street scholarship: — | |
| Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship, | $1,000 00 |
| Hills fund: — | |
| Gift of Leonard M. and Henry F. Hills of Amherst, Mass., in 1867, to establish and maintain a botanic garden, | 10,000 00 |
| Mary Robinson fund: — | |
| Gift of Miss Mary Robinson of Medfield, in 1874, for scholarship, | 1,000 00 |
| Grinnell prize fund: — | |
| Gift of Hon. Wm. Claflin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York, | 1,000 00 |
| Gassett scholarship fund: — | |
| Gift of Henry Gassett of Boston, the income to be used for scholarship, | 1,000 00 |
| Massachusetts Agricultural College investment fund: — | |
| Investment made by vote of trustees, in 1893; to purchase one share New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate, | 100 00 |
| Danforth Keyes Bangs fund: — | |
| Gift of Louisa A. Baker of Amherst, Mass., April 14, 1909, the income thereof to be used annually in aiding poor, industrious and deserving students to obtain an education in said college, | 6,000 00 |
| John C. Cutter fund: — | |
| Gift of Dr. John C. Cutter of Worcester, Mass., an alumnus of the college, who died in August, 1909, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene, | 1,000 00 |
| | $40,100 00 |

### PRIZES.

| | |
|---|---|
| Sophomore prize in botany, given by Prof. A. V. Osmun of the department of botany, to that member of the sophomore class who presents the best herbarium in the regular course (this prize was first offered in 1908 with the hope that it might stimulate a greater interest on the part of the students in this line of work), | $5 00 |

| | |
|---|---|
| Special prize, given by the Western Alumni Association to that member of the sophomore class who during his first two years has shown the greatest improvement in scholarship, character and example, . . . . . . . | $25 00 |
| Animal husbandry. The F. Lothrup Ames prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, to be given to the three students standing highest in the work of advanced live stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago. Given in May, 1912, available first in autumn of 1912, and for the four succeeding years, . . . | 150 00 |
| | $180 00 |

FRED C. KENNEY,
*Treasurer.*

# THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. V. No. 1. For January, 1913

Published Six Times a Year by the College.
Jan., Feb., Mar., May, Sept., Oct.

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Public Document No. 31

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# CATALOGUE

OF THE

# MASSACHUSETTS AGRICULTURAL COLLEGE,

## 1912-1913.

## FIFTIETH ANNUAL REPORT.

## PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 Post Office Square.
1913.

Without excluding other scientific and classical studies, and including military tactics to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

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# MASSACHUSETTS AGRICULTURAL COLLEGE,

## AMHERST.

Report

## CATALOGUE, 1912-1913.

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# THE MASSACHUSETTS AGRICULTURAL COLLEGE.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

# Calendar.

## 1913-14.

### Regular Courses.

### 1913.

| | |
|---|---|
| January 6, Monday, 1.10 P.M., | Winter recess ends; chapel. |
| January 24, Friday, | Semester examinations begin. |
| February 3, Monday, 1.10 P.M., | Second semester begins; chapel. |
| March 28, Friday, 6 P.M., | Spring recess begins. |
| April 7, Monday, 1.10 P.M., | Spring recess ends. |
| May 30, Friday, | Holiday, Memorial Day. |
| May 31, Saturday, | Senior examinations begin. |
| June 7, Saturday, | Non-senior examinations begin. |
| June 14–18, Saturday–Wednesday, | Commencement. |
| June 19–21, Thursday–Saturday, | Entrance examinations. |
| September 3–6, Wednesday–Saturday, | Entrance examinations. |
| September 10, Wednesday, 1.30 P.M., | First semester begins; chapel. |
| October 13, Monday forenoon, | Half holiday, observance of Columbus Day. |
| November 26–December 1, Wednesday, 1 P.M.–Monday, 1.10 P.M., chapel, | Thanksgiving recess. |
| December 19, Friday, 6 P.M., | Winter recess begins. |

### 1914.

| | |
|---|---|
| January 5, Monday, 1.10 P.M., | Winter recess ends; chapel. |
| January 23, Friday, | Semester examinations begin. |
| February 2, Monday, 1.10 P.M., | Second semester begins; chapel. |
| February 23, Monday forenoon, | Half holiday, observance of Washington's Birthday. |
| March 27, Friday, 6 P.M., | Spring recess begins. |
| April 6, Monday, 1.10 P.M., | Spring recess ends. |
| April 20, Monday forenoon, | Half holiday, observance of Patriots' Day. |
| June 1, Monday, | Senior examinations begin. |
| June 6, Saturday, | Non-senior examinations begin. |
| June 13–June 17, Saturday–Wednesday, | Commencement. |
| June 18–20, Thursday–Saturday, | Entrance examinations. |

# MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the first of those organized under the national land grant act of 1862. This act granted public lands to the several States and Territories, the funds realized from the sale of which should be used to establish colleges of agriculture and mechanic arts; the bill was framed by the late Senator Justin Smith Morrill of Vermont. The Legislature of Massachusetts has granted money for the erection of nearly all the buildings now on the grounds, and makes annual appropriations for the maintenance of the college.

The college was incorporated in 1863, and on the 2d of October, 1867, was formally opened to its first class of students. At that time four buildings had been erected, and there were four regular instructors employed by the institution. In 1882 the State located its agricultural experiment station on the grounds of the college. Later, after the federal law was passed granting financial aid to experiment stations, the Massachusetts Agricultural Experiment Station was consolidated with the federal station, and subsequently the whole was incorporated with the college.

COURSES. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The four-years[1] course leads to the degree of bachelor of science, and the graduate school offers advanced courses leading to the degrees of master of science and doctor of philosophy. The winter school of ten weeks, for admission to which no scholastic requirements are made, is held each winter, beginning early in January. There are other short courses at the college, such as the beekeepers' course and summer school. Various forms of extension teaching are carried on away from the college, such as correspondence courses, traveling schools, educational exhibits, lecture courses, demonstrations, etc.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement the term "agricultural vocations" is used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, landscape gardening and forestry. Students are also fitted for positions in institutions designed for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, for scientific experts in chemistry, entomology and botany, and for business operations having connection with practical agriculture.

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[1] Twenty-six teaching departments offer instruction in agriculture, horticulture, sciences, the humanities and rural social science. A system of major courses has recently been adopted which permits a student to elect work in 1 of 14 departments and to specialize in that and allied subjects for a period of two years.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences, particularly chemistry, botany and zoölogy, are an essential preparation. Still other students find the course a desirable education, without regard to future occupation. The course of study is designed to give a student a general college education, and in addition to make it possible for him to specialize in any department in which major courses are offered.

Location and Equipment. — The agricultural college is located in the town of Amherst. The grounds comprise more than 500 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is about 98 miles from Boston, and may be reached over the Central Massachusetts division of the Boston & Maine Railroad, or by way of the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

# THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was then without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about one-third of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, experimentation and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

# THE CORPORATION.

## MEMBERS OF THE CORPORATION.

| | TERM EXPIRES |
|---|---|
| WILLIAM H. BOWKER of Concord, | 1913 |
| GEORGE H. ELLIS of West Newton, | 1913 |
| CHARLES E. WARD of Buckland, | 1914 |
| ELMER D. HOWE of Marlborough, | 1914 |
| NATHANIEL I. BOWDITCH of Framingham, | 1915 |
| WILLIAM WHEELER of Concord, | 1915 |
| ARTHUR G. POLLARD of Lowell, | 1916 |
| CHARLES A. GLEASON of New Braintree, | 1916 |
| FRANK GERRETT of Greenfield, | 1917 |
| HAROLD L. FROST of Arlington, | 1917 |
| CHARLES H. PRESTON of Danvers, | 1918 |
| FRANK A. HOSMER of Amherst, | 1918 |
| DAVIS R. DEWEY of Cambridge, | 1919 |
| M. FAYETTE DICKINSON of Brookline, | 1919 |

## MEMBERS EX OFFICIO.

His Excellency Governor EUGENE N. FOSS, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
DAVID SNEDDEN, *State Commissioner of Education.*
J. LEWIS ELLSWORTH, *Secretary of the State Board of Agriculture.*

## OFFICERS OF THE CORPORATION.

His Excellency Governor EUGENE N. FOSS of Boston, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
J. LEWIS ELLSWORTH of Worcester, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

## STANDING COMMITTEES OF THE CORPORATION.[1]

### *Committee on Finance.*

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
CHARLES E. WARD.
FRANK A. HOSMER.

### *Committee on Course of Study and Faculty.*

WILLIAM WHEELER, *Chairman.*
WILLIAM H. BOWKER.
M. FAYETTE DICKINSON.
DAVID SNEDDEN.
ELMER D. HOWE.
DAVIS R. DEWEY.
FRANK A. HOSMER.

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[1] The president of the college is *ex officio* member and secretary of standing committees.

### *Committee on Farm.*

Nathaniel I. Bowditch, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
George H. Ellis.

### *Committee on Horticulture.*

J. Lewis Ellsworth, *Chairman.*
Davis R. Dewey.
Elmer D. Howe.
Harold L. Frost.

### *Committee on Experiment Department.*[1]

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
Arthur G. Pollard.
Charles E. Ward.
Harold L. Frost.

### *Committee on Buildings and Arrangement of Grounds.*

William H. Bowker, *Chairman.*
William Wheeler.
Frank Gerrett.
M. Fayette Dickinson.
Charles H. Preston.

### *Examining Committee of Overseers from the State Board of Agriculture.*

John Bursley of West Barnstable.
Frank P. Newkirk of Easthampton.
William E. Patrick of Warren.
John J. Erwin of Wayland.
R. Henry Race of North Egremont.

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[1] The director of the experiment station is a member of the committee on experiment department, without vote.

# OFFICERS OF THE INSTITUTION.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

## THE FACULTY.

Kenyon L. Butterfield, A.M., LL.D., . . . . President's House.
President of the College, and Head of Division of Rural Social Science.

George F. Mills, A.M., . . . . . . . . . 46 Amity Street.
Dean of the College and Professor of Languages and Literature.

Charles H. Fernald, Ph.D., . . . . . . . . 3 Hallock Street.
Honorary Director of the Graduate School.

William P. Brooks,[1] Ph.D., . . . . . . . . – –
Director of the Experiment Station and Lecturer on Soil Fertility.

William D. Hurd, M.Agr., . . . . . . . 82 Pleasant Street.
Director of the Extension Service.

Charles E. Marshall, Ph.D., . . . . . . . . Sunset Avenue.
Director of Graduate School and Professor of Microbiology.

Frank A. Waugh, M.Sc., . . . . Massachusetts Agricultural College.
Head of Division of Horticulture and Professor of Landscape Gardening.

James A. Foord, M.Sc., . . . . . . . . 56 Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Administration.

Robert J. Sprague, Ph.D., . . . . . . . . Mount Pleasant.
Head of Division of the Humanities and Professor of Economics and Sociology.

Joseph B. Lindsey, Ph.D., . . . . . . . 47 Lincoln Avenue.
Goessmann Professor of Chemistry.

Charles Wellington, Ph.D., . . . . . . . . 14 Maple Avenue.
Professor of Chemistry.

James B. Paige, B.Sc., D.V.S., . . . . . . . 42 Lincoln Avenue.
Professor of Veterinary Science, Chairman of Division of Science.

George E. Stone, Ph.D., . . . . . . . . . Mount Pleasant.
Professor of Botany.

Philip B. Hasbrouck, B.Sc., . . . . . . . 130 Pleasant Street.
Professor of Physics and Registrar of the College.

John E. Ostrander, A.M., C.E., . . . . . 44 North Prospect Street.
Professor of Mathematics and Civil Engineering.

Henry T. Fernald, Ph.D., . . . . . . . . . 44 Amity Street.
Professor of Entomology.

George C. Martin, C.E., Captain 18th U. S. Infantry, 35 North Prospect Street.
Professor of Military Science and Tactics.

Edward A. White, B.S., . . . . . . . . . . Mount Pleasant.
Professor of Floriculture.

William R. Hart, A.M., . . . . . . . . 97 Pleasant Street.
Professor of Agricultural Education.

Fred C. Sears, M.Sc., . . . . . . . . . . Mount Pleasant.
Professor of Pomology.

Fred C. Kenney, . . . . . . . . . . Mount Pleasant.
Treasurer of the College.

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[1] On leave of absence.

EDWARD M. LEWIS, A.M., . . . . . . . . . 34 Amity Street.
Associate Dean and Professor of Literature.

WILLIAM D. CLARK, M.F., . . . . . . 25 North Prospect Street.
Professor of Forestry.

SIDNEY B. HASKELL, B.Sc., . . . . . . . . 5 Fearing Street.
Associate Professor of Agronomy.

ROBERT W. NEAL, A.M., . . . . . . . 7 Woodside Avenue.
Associate Professor of English.

CLARENCE E. GORDON, Ph.D., . . . . . . . . Nutting Avenue.
Associate Professor of Zoölogy and Geology.

ALEXANDER E. CANCE, Ph.D., . . . . . . . . 9 Fearing Street.
Associate Professor of Agricultural Economics.

JOSEPH S. CHAMBERLAIN, Ph.D., . . . . . . . Mount Pleasant.
Associate Professor of Organic and Agricultural Chemistry.

WILLIAM P. B. LOCKWOOD, B.Sc.Agr., . . . . 5 East Pleasant Street.
Associate Professor of Dairying.

ELMER K. EYERLY, A.M., . . . . . . . . . 50 Amity Street.
Associate Professor of Rural Sociology.

JOHN A. MCLEAN, A.B., B.Sc.Agr., . . . . . . . Lincoln Block.
Associate Professor of Animal Husbandry.

JOHN C. GRAHAM, B.Sc.Agr., . . . . . . . . North Amherst.
Associate Professor of Poultry Husbandry.

GUY C. CRAMPTON, Ph.D., . . . . . . . . 86 Pleasant Street.
Associate Professor of Entomology.

CHARLES A. PETERS, Ph.D., . . . . . . . . Sunset Avenue.
Associate Professor of Inorganic and Soil Chemistry.

A. VINCENT OSMUN, M.Sc., . . . . . . . . North Amherst.
Assistant Professor of Botany.

EDGAR L. ASHLEY, A.M., . . . . . . . . . Prospect House.
Assistant Professor of German.

ANDERSON A. MACKIMMIE, A.B., . . . . . . . . Nutting Avenue.
Assistant Professor of French.

BURTON N. GATES, Ph.D., . . . . . . . . 42 Lincoln Avenue.
Assistant Professor of Beekeeping.

CURRY S. HICKS, B.Sc., . . . . . . . . . 8 Allen Street.
Assistant Professor of Physical Education and Hygiene.

FREDERICK L. YEAW, B.Sc., . . . . . . . . 17 Fearing Street.
Assistant Professor of Market Gardening.

GEORGE S. GAGE, Ph.D., . . . . . . . . . 27 Sunset Avenue.
Assistant Professor of Animal Pathology.

ERNEST ANDERSON, Ph.D., . . . . . . . . . 5 Nutting Avenue.
Assistant Professor of General and Physical Chemistry.

HENRY E. SMITH, M.A., . . . . . . . . . Nutting Avenue.
Assistant Professor of English.

GEORGE N. HOLCOMB, A.B., S.T.B., . . . . . . South Pleasant Street.
Lecturer in History.

FRANK W. RANE, M.F., . . . . . . . . . . . Boston.
Lecturer in Forestry.

CHARLES R. GREEN, B.Agr., . . . . . . . . Mount Pleasant.
Librarian.

C. ROBERT DUNCAN, B.Sc., . . . . . . . 31 North Prospect Street.
Instructor in Mathematics.

ARTHUR K. HARRISON, . . . . . . . . . 8 Allen Street.
Instructor in Landscape Gardening.

CHESTER A. BUTMAN, B.Sc., . . . . . . . . 15 Spring Street.
Instructor in Physics.

WILLARD A. WATTLES, A.M., . . . . . . . . Mount Pleasant.
Instructor in English.

WILLIAM L. HARMOUNT, A.B., . . . . . . . 86 Pleasant Street.
Instructor in French.

ELVIN L. QUAIFE, B.Sc.Agr., . . . . . . . . 9 Fearing Street.
Instructor in Animal Husbandry.

William L. Machmer, A.M., . . . . . . . . Kendrick Place.
Instructor in Mathematics.

Arthur N. Julian, B.A., . . . . . . . 50 Pleasant Street.
Instructor in German.

Walter W. Chenoweth, M.Sc., . . . . . . . . North Amherst.
Instructor in Pomology.

Walter E. Prince, B.A., . . . . . . . . 13 Spring Street.
Instructor in English and Public Speaking.

Abbott A. Brown, B.Sc.Agr., . . . . . . . . North Amherst.
Instructor in Poultry Husbandry.

Elmer M. McDonald, B.Sc., . . . . . . . 15 Fearing Street.
Instructor in Agronomy.

Samuel Coons, . . . . . . . . . . 56 Pleasant Street.
Buttermaker.

Helena T. Goessmann, Ph.M., . . . . . . . . 44 Amity Street.
Assistant in English.

Samuel R. Parsons, B.Sc., . . . . . . . . 77 Pleasant Street.
Assistant in Mathematics and in Military Science.

Frederick A. McLaughlin, B.Sc., . . . . . . . . Clark Hall.
Assistant in Botany.

William J. Fitzmaurice, . . . . . . . . . – –
Assistant in Physical Education.

Robert H. Bogue, B.Sc., . . . . . . . . 17 Phillips Street.
Assistant in Chemistry.

### Graduate Assistants.

Irving W. Davis, B.Sc., . . . . . . . . . 96 Pleasant Street.
Assistant in Beekeeping.

G. Scott Fowler, B.Sc., . . . . . . . . . 15 Phillips Street.
Assistant in Chemistry.

Rupert G. Gates, B.Sc., . . . . . . . . 120 Pleasant Street.
Assistant in Chemistry.

James F. Martin, B.Sc., . . . . . . . . 19 South East Street.
Assistant in Entomology.

Harry A. Noyes, B.Sc., . . . . . . . . Chemistry Laboratory.
Assistant in Chemistry.

Ralph R. Parker, B.Sc., . . . . . . . . 13 Fearing Street.
Assistant in Zoölogy and Geology.

Raymond G. Smith, B.Sc., . . . . . . . 5½ East Pleasant Street.
Assistant in Botany.

### Other College Officers.

Edwin H. Forristall, M.Sc., . . . . . Massachusetts Agricultural College.
Farm Superintendent.

Ralph J. Watts, B.Sc., . . . . . . . . . Nutting Avenue.
Secretary to the President.

Harold A. Crane, . . . . . . . . . . 1 Woodside Avenue.
Cashier.

Newton Wallace, . . . . . . . . . . . 6 Phillips Street.
Electrician.

Percy C. Schroyer, . . . . . . . . . 120 Pleasant Street.
Assistant Engineer.

Clarence A. Jewett, . . . . . . . . . 112 Pleasant Street.
Superintendent of Buildings.

James Whiting, . . . . . . . . . . . Hallock Street.
Foreman, Department of Floriculture.

William Chesley, . . . . . . . . . . . Draper Hall.
Steward, Dining Hall.

John J. Lee, Sergeant, . . . . . . . . . 9 Phillips Street.
Assistant to the Military Detail.

Miss Mary E. Caldwell, . . . . . . . . . . Draper Hall.
Bookkeeper.

| | |
|---|---|
| Miss Henrietta Webster,<br>Clerk, Treasurer's Office. | Draper Hall. |
| Miss Dorothy Mudge,<br>Clerk, Treasurer's Office. | Gaylord Street. |
| Miss Stella H. Webb,<br>Correspondence Clerk, President's Office. | 9 Phillips Street. |
| Miss Lillian M. Gelinas,<br>Clerk, President's Office. | East Pleasant Street. |
| Miss Alice Gilbert,<br>Stenographer, Division of Agriculture. | Gaylord Street. |
| Miss Luliona N. Barker,<br>Stenographer, Division of Agriculture. | 9 Phillips Street. |
| Miss Georgia A. King,<br>Clerk, Registrar's Office. | 9 Phillips Street. |
| Miss Helen V. Gaskill,<br>Stenographer, Division of Floriculture. | 105 Main Street. |
| Miss Lina Fisher,<br>Stenographer, Department of Chemistry. | 28 Pleasant Street. |
| Miss Gladys E. Russell,<br>Stenographer, Division of Horticulture. | Draper Hall. |
| Miss Virginia Noble,<br>Clerk, Dean's Office. | Draper Hall. |
| Miss Lorian P. Jefferson,<br>Expert Secretary, Division of Rural Social Science. | Kendrick Place. |

## THE EXTENSION SERVICE STAFF.

| | |
|---|---|
| William D. Hurd, M.Agr.,<br>Director. | 82 Pleasant Street. |
| Earnest D. Waid, B.Agr.,<br>Assistant Director. | Amity Street. |
| Orion A. Morton,<br>Extension Professor of Agricultural Education. | Mount Pleasant. |
| Ezra L. Morgan, M.A.,<br>Community Field Agent. | Amity Street. |
| George F. E. Story, B.Sc.Agr.,<br>Extension Instructor in Dairying and Animal Husbandry. | 10 Allen Street. |
| Ralph W. Rees, B.Sc.,<br>Extension Instructor in Pomology. | 17 Fearing Street. |
| Charles H. White, B.Sc.,<br>Field Agent, Worcester County. | North Uxbridge. |
| Herbert J. Baker, B.Sc.,<br>Field Agent in Farm Management. | – – |
| Arthur T. Dailey, B.Sc.,<br>Supervisor of Correspondence Courses. | 9 Fearing Street. |
| Albert W. Doolittle,<br>Field Agent, Barnstable County. | Sandwich. |
| Miss Mabel R. Case,<br>Clerk to the Director. | Draper Hall. |
| Miss Hannah Griffin,<br>Clerk. | Draper Hall. |

## THE EXPERIMENT STATION STAFF.

| | |
|---|---|
| William P. Brooks,[1] Ph.D.,<br>Director. | – – |
| Fred W. Morse, Ph.D.,<br>Acting Director. | 40 Pleasant Street. |
| Joseph B. Lindsey, Ph.D.,<br>Vice-Director. | 47 Lincoln Avenue. |
| Fred C. Kenney,<br>Treasurer. | Mount Pleasant. |
| Charles R. Green, B.Agr.,<br>Librarian. | Mount Pleasant. |

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[1] On leave of absence.

### DEPARTMENT OF PLANT AND ANIMAL CHEMISTRY.

Joseph B. Lindsey, Ph.D., 47 Lincoln Avenue.
Chemist.

Edward B. Holland, M.Sc., 28 North Prospect Street.
Associate Chemist, in charge of Research Division.

Fred W. Morse, Ph.D., 40 Pleasant Street.
Research Chemist.

Henri D. Haskins, B.Sc., Amherst House.
In charge of Fertilizer Division.

Philip H. Smith, M.Sc., 102 Main Street.
In charge of Feed and Dairy Division.

Lewell S. Walker, B.Sc., 19 Phillips Street.
Assistant.

James C. Reed, B.Sc., Nutting Avenue.
Assistant.

Rudolph W. Ruprecht, B.Sc., 31 Amity Street.
Assistant.

George R. Pierce, B.Sc., 53 Lincoln Avenue.
Assistant.

Carleton P. Jones, B.Sc., 30 North Prospect Street.
Assistant.

Joseph T. Howard, North Amherst.
Collector.

Harry L. Allen, 89 Main Street.
Assistant.

James R. Alcock, Massachusetts Agricultural College.
Assistant in Animal Nutrition.

Carlos L. Beals, B.Sc., North Amherst.
Assistant.

### DEPARTMENT OF AGRICULTURE.

William P. Brooks,[1] Ph.D., — —
Agriculturist.

Henry J. Franklin, Ph.D., East Wareham.
In charge of Cranberry Investigation.

Edwin F. Gaskill, B.Sc., North Amherst.
Assistant Agriculturist.

### DEPARTMENT OF HORTICULTURE.

Frank A. Waugh, M.Sc., Massachusetts Agricultural College.
Horticulturist.

Fred C. Sears, M.Sc., Mount Pleasant.
Pomologist.

Jacob K. Shaw, Ph.D., 1 Allen Street.
Assistant Horticulturist.

### DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

George E. Stone, Ph.D., Mount Pleasant.
Botanist and Vegetable Pathologist.

George H. Chapman, M.Sc., 13 Fearing Street.
Assistant Botanist.

Edward A. Larrabee, B.Sc., Clark Hall.
Assistant Botanist.

### DEPARTMENT OF ENTOMOLOGY.

Henry T. Fernald, Ph.D., 44 Amity Street.
Entomologist.

Burton N. Gates, Ph.D., 42 Lincoln Avenue.
Apiarist.

Arthur I. Bourne, B.A., 12 East Pleasant Street.
Assistant in Entomology.

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[1] On leave of absence.

### DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., . . . . . . . 42 Lincoln Avenue.
Veterinarian.

### DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., . . . . . 35 North Prospect Street.
Meteorologist.
HARRIS W. ANGIER, . . . . . . . Massachusetts Agricultural College.
Observer.

### OTHER OFFICERS OF THE EXPERIMENT STATION.

BENJAMIN G. SOUTHWICK, B.Sc., . . . Massachusetts Agricultural College.
Secretary to the Director.
Mrs. LUCIA G. CHURCH, . . . . . . . . 4 Hallock Street.
Stenographer, Director's Office.
Miss F. ETHEL FELTON, . . . . . . . . 9 Phillips Street.
Stenographer, Department of Plant and Animal Chemistry.
Miss BRIDIE O'DONNELL, . . . . . . . . . . Hadley.
Stenographer, Department of Entomology.
Miss ALICE M. HOWARD, . . . . . . . . North Amherst.
Stenographer, Department of Plant and Animal Chemistry.
Miss JESSIE V. CROCKER, . . . . . . . . . Sunderland.
Stenographer, Department of Botany.
Miss GRACE E. GALLOND, . . . . . . . 28 Pleasant Street.
Stenographer, Director's Office.
Miss MARY R. KINGSBURY, . . . . . . . . 97 Pleasant Street.
Stenographer, Department of Poultry Husbandry.

# STANDING COMMITTEES OF THE FACULTY.[1]

## 1912-13.

### CATALOGUE AND OTHER PUBLICATIONS.

Associate Professor NEAL.
Associate Professor EYERLY.
Associate Professor CANCE.

### COMMENCEMENT.

Professor PAIGE.
Captain MARTIN.
Professor WHITE.
Mr. KENNEY.
Mr. DUNCAN.
Mr. PHILIP H. SMITH.[2]

### COURSE OF STUDY.

Professor HART.
Professor WAUGH.
Professor FOORD.
Professor OSTRANDER.
Professor SPRAGUE.
Associate Professor CHAMBERLAIN.

### DISCIPLINE (ADVISORY).

Professor MILLS.
Professor HASBROUCK.
Captain MARTIN.
Professor LEWIS.
Associate Professor GORDON.
Assistant Professor MACKIMMIE.

### EMPLOYMENT.

Professor SEARS.
Mr. KENNEY.
Associate Professor HASKELL.

### ENTRANCE EXAMINATIONS AND ADMISSION.

Professor HASBROUCK.
Associate Professor GRAHAM.
Assistant Professor OSMUN.
Assistant Professor ASHLEY.
Mr. MACHMER.
Mr. WATTLES.

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[1] The president of the college is ex officio member of each standing committee.
[2] Not a member of the faculty.

### GRADUATE SCHOOL.

Director MARSHALL.
  Professor LINDSEY.
  Professor PAIGE.
  Professor STONE.
  Professor FERNALD.
  Professor SEARS.
  Associate Professor GORDON.

### LIBRARY.

Professor STONE.
  Professor WELLINGTON.
  Professor MARSHALL.
  Associate Professor CANCE.

### PHYSICAL EDUCATION AND ATHLETICS.

Assistant Professor HICKS.
  Director HURD.
  Professor LEWIS.
  Assistant Professor YEAW.

### SCHEDULE.

Associate Professor LOCKWOOD.
  Associate Professor NEAL.
  Associate Professor PETERS.

### SCHOLARSHIP.

Associate Professor GORDON.
  Professor MILLS.
  Professor HASBROUCK.
  Professor LEWIS.
  Assistant Professor MACKIMMIE.

### STUDENT LIFE.

Director HURD.
  Professor LEWIS.
  Associate Professor CHAMBERLAIN.
  Associate Professor McLEAN.
  Associate Professor HASKELL.
  Assistant Professor MACKIMMIE.
  Assistant Professor HICKS.

### UNCLASSIFIED STUDENTS.

Professor WHITE.
  Associate Professor LOCKWOOD.
  Associate Professor PETERS.

# THE COLLEGE.

# ADMISSION.

## A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege on or before June 1 of the year in which examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

## B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be met by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.

2. By presenting certificate from any school approved by the college entrance examination boards.

3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.[1]

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[1] *Entrance with Condition in English.* — Under the rule permitting entrance conditions of not more than two units of the preparatory subjects applicants may be admitted, upon examination, with a condition in English, provided that they show, upon examination, satisfactory preparation in work entitling them to a ranking of 60 or higher.

Students so admitted, must, to remove the condition, pass an examination covering the regular 3-units requirement.

*Places of Examination.* — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Physics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall.

In September, examinations will be held in Amherst only.

*Schedule for Entrance Examinations, June 19–21, inclusive, 1913.* — The examinations in June will follow this schedule: —

*First Day.*

| | |
|---|---|
| 7.45 A.M. | Registration.[1] |
| 8 A.M. | Plane geometry. |
| 10 A.M. | Chemistry. |
| 11.30 A.M. | Botany. |
| 2 P.M. | Algebra. |
| 3.30 P.M. | Physics. |

*Second Day.*

| | |
|---|---|
| 8 A.M. | Required English. |
| 11 A.M. | Solid geometry. |
| 2 P.M. | History, required and elective. |

*Third Day.*

| | |
|---|---|
| 8 A.M. | French, German, required and elective. |
| 1 P.M. | Latin A and B and all one-half electives, except those already noted. |

*Schedule for Entrance Examinations in September.* — In September, 1913, the examinations will be given September 3–6, inclusive, and will follow the order indicated below: —

*First Day.*

| | |
|---|---|
| 1 P.M. | Registration. |
| 1.15–5 P.M. | Greek A and B. |

*Second Day.*

| | |
|---|---|
| 8 A.M. | Plane geometry. |
| 10 A.M. | Chemistry. |
| 11.30 A.M. | Botany. |
| 2 P.M. | Algebra. |
| 3.30 P.M. | Physics. |
| 4.30 P.M. | Elective English. |

*Third Day.*

| | |
|---|---|
| 8 A.M. | Required English. |
| 11 A.M. | Solid geometry, agriculture. |
| 2 P.M. | History, required and elective. |

*Fourth Day.*

| | |
|---|---|
| 8 A.M. | French, German, required and elective. |
| 1 P.M. | Latin A and B and all one-half credit electives, except those already noted. |

### C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of four or five recitations a week for a school year. Neither more nor less credit will be given in any subject than is indicated in the table below. Fourteen units must be offered for admission, of which eight and one-half are required and five and one-half are elective.

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[1] Candidates who have no examination at the time set for registration may register at the time of their first examination should they so desire.

(*a*) The following eight and one-half units are required: —

*Language.*

| | |
|---|---|
| English, | 3 |
| French or German, | 2 |

*History and Civics.*

| | |
|---|---|
| History (elective), | 1 |
| (*a*) Ancient history. | |
| (*b*) Medieval and modern history. | |
| (*c*) English history. | |
| (*d*) General history. | |
| (*e*) United States history and civics. | |

*Mathematics.*

| | |
|---|---|
| Algebra, through progressions, | 1½ |
| Plane geometry, | 1 |

(*b*) In addition to the requirements under (*a*), five and one-half units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

*Language.*

| | |
|---|---|
| English in addition to requirements, | 1 |
| French in addition to requirements, | 2 or 1 [1] |
| German in addition to requirements, | 2 or 1 [1] |
| Greek, | 2 or 3 |
| Latin, | 2 or 3 |

*History.*

| | |
|---|---|
| In addition to requirements, | 1, 2, or 3 |

*Mathematics, and Other Sciences.*

| | |
|---|---|
| Solid geometry, | ½ |
| Trigonometry, | ½ |
| Chemistry, | 1 |
| Physiography, | ½ |
| Physiology, | ½ |
| Agriculture,[2] | ½ or 1 |
| Botany,[2] | ½ or 1 |
| Geology,[2] | ½ |
| Physics,[2] | 1 |
| Zoölogy,[2] | ½ |
| Commercial geography,[3] | ½ |
| Drawing,[3] | ½ |
| Manual training,[3] | ½ or 1 |

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[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] Certification necessary in these subjects; no examinations given.

**PRESENTATION OF NOTE-BOOKS.** — **The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, page 25).**

**Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificate should not present note-books; but their certificate must state that note-books have been satisfactorily completed.**

## D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

**In some cases the requirements of the College Entrance Examination Board are here mentioned. A pamphlet containing detailed explanation of these requirements can be had of the Board for 10 cents. Address substation 84, New York City.**

AGRICULTURE.[1] — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade. The examination in agriculture will be given in September only.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen and Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations;

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[1] Examination given in September only.

the binomial theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body: Briefer Course."

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

HISTORY. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United

States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

ENGLISH. — For 1913, 1914: —

*English Grammar and Composition.* — Command of correct and clear English (spoken or written) requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

*Literature.* — Ability to read with accuracy, intelligence and appreciation is sought through study of books included in two lists, headed respectively "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud, and encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

(*a*) Reading: The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units (each unit being set off by semicolons) are to be selected, two from each group: —

I. The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission if desired, of books XI., XIII., XIV., XV., XVII., XXI.; Virgil's "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakspere's "Merchant of Venice;" "Midsummer Night's Dream;" "As You Like It;" "Twelfth Night;" "Henry the Fifth;" "Julius Cæsar."

III. Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" either Scott's "Ivanhoe" or "Quentin Durward;" Hawthorne's "House of the Seven Gables;" either Dickens's "David Copperfield" or "A Tale of Two Cities;" Thackeray's "Henry Esmond;" Mrs. Gaskell's "Cranford;" George Eliot's "Silas Marner;" Stevenson's "Treasure Island."

IV. Bunyan's "Pilgrim's Progress," Part I.; "The Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography" (condensed); Irving's "Sketch Book," Macaulay's "Essays on Lord Clive" and "Warren Hastings;" Thackeray's "English Humourists;" selections from Lincoln, including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address and the letter to Horace Greeley, along with a brief memoir or estimate; Parkman's "Oregon Trail;" either Thoreau's "Walden," or Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge;" "A Liberal Education" and "A Piece of Chalk;" Stevenson's "Inland Voyage" and "Travels with a Donkey."

V. Palgrave's "Golden Treasury" (first series), books II. and III., with especial attention to Dryden, Collins, Gray, Cowper and Burns; Gray's "Elegy in a Country Churchyard" and Goldsmith's "Deserted Village;" Coleridge's "Ancient Mariner" and Lowell's "Vision of Sir Launfal;" Scott's "Lady of the Lake;" Byron's "Childe Harold," Canto IV., and "Prisoner of Chillon;" Palgrave's "Golden Treasury" (first series), book IV., with especial attention to Wordsworth, Keats and Shelley; Poe's "Raven," Longfellow's "Courtship of Miles Standish," and Whittier's "Snow Bound;" Macaulay's "Lays of Ancient Rome" and Arnold's "Sohrab and Rustum;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City."

(*b*) Study: This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration and an essay, as follows: —

Shakspere's "Macbeth;" Milton's "L'Allegro," "Il Penseroso" and "Comus;" either Burke's "Speech on Conciliation with America," or both Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" either Macaulay's "Life of Johnson," or Carlyle's "Essay on Burns."

*Examination.* — However accurate in subject-matter, no paper will be deemed satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be based upon ten units chosen, in accordance with the plan described earlier, from the lists headed reading; and it may include also questions upon grammar and the simpler principles of rhetoric, and short compositions upon topics drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

The second part of the examination will include composition and these books comprised in the list headed study. The test in composition will consist of one essay or more, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

ENGLISH, ELECTIVE.[1] — To secure a fourth entrance credit in English, the applicant should do (*a*) the full equivalent of three years' work (required English), and also (*b*) the full equivalent of a fourth year's work. Applicants not certified with a fourth entrance credit will be examined, provided that the applicant, on or before June 1, notify the Department of English of his intention to take the examination, and supply thereafter the information needed by the department to prepare the examination questions. The information blanks will be forwarded by the Department of English upon receipt of the notice.

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[1] Examination given in September only.

*Subjects accepted.* — The applicant may offer (*a*) any one of the subjects stated hereunder, or (*b*) any two of these subjects in combination.

(*a*) History of American literature.

(*b*) History of English literature (or lives of the great authors).

(*c*) Classics *other than those read to meet the three-credit requirement.*

(*d*) Advanced composition.

(*e*) History of the English language.

(*f*) Advanced high school grammar.

*Advanced Standing in College.* — Whether advanced standing shall be given applicants entering with a fourth credit in English will be determined by consideration of each case individually. Much weight is given to the ability of the student to express himself correctly and clearly, to think clearly, and to grasp the meaning of printed language. A special examination will be given in the opening week of college, notice of which will be posted on the English bulletin board, for freshmen who wish to apply for advanced standing.

*Presentation of Note-books and Themes.* — Applicants for examination, either for fourth-unit credit or for advanced standing, are advised to present the note-books, themes, etc., prepared by them in the preparatory school, as an aid toward determining their proficiency.

For 1915–19 inclusive: —

The requirements for entrance to the Massachusetts Agricultural College continue to be those of the National Conference on Uniform Entrance Requirements in English (for detailed statement governing 1915–19, apply to the College Entrance Examination Board).

Attention is called to two recommendations of the National Conference made in the official statement of requirements for 1915–19; namely: —

1. That colleges so desiring may set an examination requiring no prescribed books, but testing the same general kind of preparation as that indicated in the standard requirements.

2. That individual colleges take such steps as may be found necessary to ascertain whether candidates for entrance possess an adequate equipment in oral English.

These recommendations agree with the policy of the agricultural college, which will, as rapidly as seems expedient, proceed in accordance with them. Schools wishing to present candidates prepared in accordance with the intent of these recommendations will have the co-operation of the college. The college understands this intent to be the development of the pupil's powers of thought, understanding and expression; the test to be not merely a test of memory, but even more a test of ability, to be shown by dealing with new problems calling for the application of his previously gained knowledge and skill.

The list of books prescribed for 1915–19 here follows: —

(A) *Reading*: With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I: —

*Group I. Classics in Translation.* — The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther;

the "Odyssey," with the omission, if desired, of books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of books XI., XIII., XIV., XV., XVII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellency.

For any selection from this group a selection from any other group may be substituted.

*Group II. Shakspere.* — "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

*Group III. Prose Fiction.* — Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one*, "Guy Mannering," "Ivanhoe," "Old Mortality," "Quentin Durward," "Rob Roy," or "The Talisman;" Jane Austen's novels, any *one*; Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens's novels, any *one*; Thackeray's novels, any *one*; George Eliot's novels, any *one*; Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevensons "Treasure Island," "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one*; Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables," "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

*Group IV. Essays, Biography, etc.* — Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tattler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" Irving's selections from the "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" Lamb's selections from the "Essays of Elia" (about 100 pages); Lockhart's selections from the "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison, and Steele in the English Humorists;" Macaulay: any one of the following of Macaulay's essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay;" Trevelyan's selections from the "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years before the Mast;" Lincoln's "Selections," including at least the two "Inaugurals," the "Speeches in Independence Hall and at Gettysburg," the "Last Public Address," the "Letter to Horace Greeley," together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's "Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal

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[1] If not chosen for study under B.

Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson, and later writers; a collection of "Letters" by various standard writers.

*Group V. Poetry.* — Palgrave's "Golden Treasury" (first series), books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury" (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens," and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake" or "Marmion;" Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine," and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Hervé Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum" and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

(B) *Study:* This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

*Group I. Drama.* — Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

*Group II. Poetry.* — Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

*Group III. Oratory.* — Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

*Group IV. Essays.* — Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

French. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

GERMAN. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

GREEK.[1] — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

LATIN. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. Three credit units will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

COMMERCIAL GEOGRAPHY. — Preparation should be given in a course equivalent to that laid down in Adam's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

DRAWING. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see "Manual Training."

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[1] Examination given in September only.

MANUAL TRAINING. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

### E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.
2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

### F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)
2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.
3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.
4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination, in the week following the Thanksgiving recess. (2) Second entrance condition examination, in the sixteenth week of the first semester.
5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.
6. Examinations in part of the subjects required for entrance may be taken one year before entering college.
7. For information concerning expenses, scholarships, etc., see "General Information."
8. For information concerning admission to short courses see "Short Courses."
9. All requests for information concerning admission of unclassified students should be addressed to Prof. E. A. White, chairman of committee on unclassified students.

### G. UNCLASSIFIED STUDENTS.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

2. No applicant under twenty-one years of age will be admitted as an unclassified student.

3. Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

4. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

5. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

6. All unclassified students are subject to the supervision of a special committee.

7. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

8. Unclassified students are subject to the regulations applying to classified students.

9. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

10. No unclassified student shall be allowed to participate in any intercollegiate contests.

# COURSES OF INSTRUCTION.

## A. TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

### FRESHMAN YEAR.

*First Semester.*

[All work required.]

| | |
|---|---|
| Chemistry, | 3 |
| Algebra, | 3 |
| Solid Geometry,[1] | 2 |
| English, | 4 |
| Public Speaking (at option of instructor), | 1 |
| French or German,[2] | 4 |
| Drill, | 1 |
| Hygiene, | 1 |
| College Life (attendance without credit). | |
| | 18 or 19 |

*Second Semester.*

[All work required.]

| | |
|---|---|
| Animal Husbandry, | 2 |
| Chemistry, | 3 |
| Trigonometry, | 3 |
| Algebra, | 2 |
| English, | 4 |
| Public Speaking (if not taken in semester one), | 1 |
| French or German, | 4 |
| Drill, | 1 |
| Physical Education, | 1 |
| | 20 or 21 |

### SOPHOMORE YEAR.

*First Semester.*

[All work required.]

| | |
|---|---|
| Agronomy, | 3 |
| Physics, | 5 |
| Zoölogy, | 3 |
| English, | 2 |
| French or German, | 3 |
| Tactics, | 1 |
| Drill, | 1 |
| | 18 |

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[1] To be taken in course when not offered for entrance.

[2] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

### *Second Semester.*

[All courses under "Required," with any two of those under "Elective."]

[Required.]

| | |
|---|---|
| Elementary Horticulture, | 2 |
| Botany, | 4 |
| English, | 2 |
| Agricultural Industry, | 3 |
| Drill, | 1 |
| Tactics, | 1 |
| Physical Education, | 1 |
| | 14 |

[Elective.]

| | | |
|---|---|---|
| French or German,<br>Animal Husbandry,<br>Geology,<br>Physics,<br>Chemistry,<br>Surveying, | Each 3 hours. Any two, | 6 |
| | | 20 |

## B. MAJORS: JUNIOR AND SENIOR YEARS.

### General Statement.

A major consists of 30 hours of correlated work, to be arranged by the student and an instructor called the adviser. The special provisions applying to the class of 1913 are given in the footnote.[1]

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their department. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

### Rules.

Rule 1. *Election.* — Each student, in the second semester of his sophomore year, shall elect a major subject from the list of majors given below; and this major shall consist of 30 credit hours of correlated work.

Rule 2. *Minimum Credits.* — The minimum number of credits for the junior and senior years shall be 65, inclusive of Military Drill and Physical Education.

Rule 3. *Maximum Credits.* — The maximum number of credits for any semester of the junior or senior year shall be 21.

Rule 4. *Humanities and Rural Social Science.* — A minimum of 15 credit hours in the Divisions of the Humanities and Rural Social Science shall be required of all students during their junior and senior years, with the following restriction: that a minimum of 3 credit hours will be required in each of the divisions.

Rule 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 30 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

Rule 6. *Free Electives.* — Each student is required to take 30 hours in his major and also 15 hours in the Divisions of the Humanities and Rural Social Science, making a total of 45 hours. He is allowed free choice for the remaining part of his required hours, this remainder amounting to 15 hours minimum for the two years, or 35 hours maximum.

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[1] Since it will not be possible for the class of 1913 to conform fully with the regulations concerning majors given above, the following regulations will apply to them in making their elections: —

As stated below, the minimum semester credits will be 15 hours, the maximum 21 hours, and the members of the class of 1913 will fill out their elective cards with these facts in mind. For the class of 1913 the required work after the sophomore year is to be counted as follows: —

5 credits in the junior year in Military Science and Physical Education.

3 credits in Economics 1.

3 credits in English, in other subjects in the Humanities, or in Rural Social Science.

RULE 7. *Registration.* — No upper classman shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office on June 5.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the year and will countersign the same.

(3) Each course card must be filled out, giving the name of student, with his college address, also the name of parent or guardian, with the home address. When the elections have been entered on this card, and the balance of hours added by the student, the card must be returned to the registrar not later than June 16.

RULE 8. *Changes.* — Applications for changes may be made to the dean in writing at any time, and, when approved by him and by the committee on scholarship, become operative at the beginning of the semester following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

## LIST OF MAJORS.

### *Agriculture.*

Prof. JAMES A. FOORD, Adviser.

| Course. | Credit. |
|---|---|
| Agronomy 3, | 3 |
| Agronomy 6, | 3 |
| Animal Husbandry 3, | 3 |
| Animal Husbandry 5, | 3 |
| Animal Husbandry 6, | 1 |
| Animal Husbandry 9, | 3 |
| Dairying 1, | 3 |
| Dairying 2, | 3 |
| Farm Administration 3, | 3 |
| Farm Administration 4, | 3 |
| Veterinary Science 1, | 3 |
| | 31 |

### *Agronomy.*

Associate Prof. SIDNEY B. HASKELL, Adviser.

| Course. | Credit. |
|---|---|
| Agronomy 3, | 3 |
| Agronomy 4, | 3 |
| Agronomy 5, | 3 |
| Agronomy 6, | 3 |
| Agronomy 8, | 3 |
| Animal Husbandry 5, | 3 |
| Animal Husbandry 9, | 3 |
| Farm Administration 4, | 3 |
| Chemistry 7, | 3 |
| Chemistry 8, | 3 |
| | 30 |

## *Animal Husbandry.*

Associate Prof. J. ALLAN MCLEAN, Adviser.

| Course. | Credit. |
|---|---|
| Agronomy 3, | 3 |
| Animal Husbandry 3, | 3 |
| Animal Husbandry 5, | 3 |
| Animal Husbandry 6, | 1 |
| Animal Husbandry 8, | 2 |
| Animal Husbandry 9, | 3 |
| Animal Husbandry 10, | 3 |
| Animal Husbandry 11, | 2 |
| Dairying 1, | 3 |
| Farm Administration 3, | 3 |
| Farm Administration 4, | 3 |
|  | 29 |

## *Dairying.*

Associate Prof. WILLIAM P. B. LOCKWOOD, Adviser.

| Course. | Credit. |
|---|---|
| Animal Husbandry 5, | 3 |
| Animal Husbandry 6, | 1 |
| Animal Husbandry 8, | 2 |
| Animal Husbandry 9, | 3 |
| Animal Husbandry 11, | 2 |
| Dairying 1, | 3 |
| Dairying 2, | 3 |
| Dairying 3, | 3 |
| Dairying 4, | 3 |
| Farm Administration 3, | 3 |
| Farm Administration 4, | 3 |
|  | 29 |

## *Poultry Husbandry.*

Associate Prof. JOHN C. GRAHAM, Adviser.

| Course. | Credit. |
|---|---|
| Poultry Husbandry 1, | 2 |
| Poultry Husbandry 2, | 2 |
| Poultry Husbandry 3, | 1 |
| Poultry Husbandry 4, | 1-3 |
| Poultry Husbandry 5, | 1 |
| Poultry Husbandry 6, | 3 |
| Poultry Husbandry 7, | 3 |
| Poultry Husbandry 9, | 3 |
| Pomology 1, | 3 |
| Agronomy 3, | 3 |
| Animal Husbandry 5, | 3 |
| Animal Husbandry 9, | 3 |
| Veterinary Science 1, | 3 |
|  | 31 |

## *General Horticulture.*

Prof. FRANK A. WAUGH, Adviser.

This major will consist of courses selected from the Departments of Pomology, Floriculture, Market Gardening, Landscape Gardening and Forestry, to suit the particular needs of the student. In special cases, courses from the Department of Agronomy will also be counted toward the major in general horticulture.

### *Floriculture.*

Prof. EDWARD A. WHITE, Adviser.

| Course. | Credit. |
|---|---|
| Floriculture 1, | 4 |
| Floriculture 2, | 4 |
| Floriculture 3, | 3 |
| Floriculture 4, | 3 |
| Horticulture 3, | 3 |
| Horticulture 4, | 3 |
| Entomology 1, | 3 |
| Market Gardening 2, | 3 |
| Botany 2, | 4 |
| | 30 |

*Note.* — Horticulture 3 and 4 is a junior subject, but to balance the work for the two years it would be better for the floricultural students to take the course in the senior year.

### *Forestry.*

Prof. WILLIAM D. CLARK, Adviser.

| Course. | Credit. |
|---|---|
| Forestry 1, | 3 |
| Forestry 2, | 3 |
| Forestry 3, | 3 |
| Forestry 4, | 3 |
| Forestry 5, | 2 |
| Forestry 6, | 2 |
| Entomology 5, | 3 |
| Horticulture 3, | 3 |
| Horticulture 4, | 3 |
| Botany 13, | 4 |
| | 29 |

### *Landscape Gardening.*

Prof. FRANK A. WAUGH, Adviser.

| Course. | Credit. |
|---|---|
| Landscape Gardening 1, | 3 |
| Landscape Gardening 2, | 3 |
| Landscape Gardening 3, | 3 |
| Landscape Gardening 4, | 3 |
| Landscape Gardening 5, | 2 |
| Landscape Gardening 6, | 2 |
| Landscape Gardening 7, | 3 |
| Landscape Gardening 8, | 3 |
| Drawing 1, | 3 |
| Drawing 2, | 3 |
| Horticulture 3, | 3 |
| | 31 |

Landscape Gardening 6 will probably be given quite differently in alternate years, and thus should be open to *both* juniors and seniors.

Courses for juniors *only:* Landscape Gardening 1 and 2, Drawing 1 and 2.

Courses for seniors and graduates *only:* Landscape Gardening 7 and 8.

Courses open to juniors and seniors, both if possible: Horticulture 3 and 4 and possibly Landscape Gardening 3 and 4.

This grouping of subjects is offered only as an example. Other groupings may be approved by the adviser, but such other groupings must be subject to the class schedule.

### *Pomology.*

Prof. FRED C. SEARS, Adviser.

| Course. | Credit. |
|---|---|
| Pomology 1, | 3 |
| Pomology 2, | 3 |
| Pomology 3, | 3 |
| Pomology 4, | 3 |
| Botany 5, | 2 |
| Botany 7, | 5 |
| Agronomy 6, | 3 |
| Farm Administration 3, | 3 |
| Farm Administration 4, | 3 |
| Entomology 2, | 3 |
| | 31 |

### *Agricultural Chemistry.*

Associate Prof. CHARLES A. PETERS, Adviser.

| Course. | Credit. |
|---|---|
| Chemistry 5, | 5 |
| Chemistry 6, | 5 |
| Chemistry 9, | 5 |
| Chemistry 10, | 5 |
| Chemistry 11, | 5 |
| Chemistry 12, 14 or 16, | 5 |
| Chemistry 13, | 3 |
| Chemistry 15, | 3 |
| Chemistry 18, | 2 |
| | 38 |

The major will consist of 30 credit hours selected from this list. The student will be advised concerning other subjects suited to be taken in connection with Chemistry.

### *Economic Entomology.*

Prof. HENRY T. FERNALD, Adviser.

| Course. | Credit. |
|---|---|
| Entomology 1, | 3 |
| Entomology 2, | 2 |
| Entomology 3, | 4 |
| Entomology 4, | 4 |
| Entomology 5, | 3 |
| Entomology 8, | 3 |
| Botany 3, | 4 |
| Botany 4, | 2 |
| Zoölogy 3, | 3 |
| Zoölogy 4, | 3 |
| | 31 |

A major in Economic Entomology does not necessarily include all the subjects given in this list, but may be varied to some extent, in accordance with the future plans of the student, other modifications being permissible.

### *Plant Physiology and Pathology.*

Prof. George E. Stone, Adviser.

| Course. | Credit. |
|---|---|
| Botany 3, | 4 |
| Botany 4, | 2 |
| Botany 10, | 4 or 5 |
| Botany 14, | 4 |
| Chemistry 5, | 5 |
| Chemistry 6, | 5 |
| Entomology 1, | 3 |
| Entomology 2, | 2 |
| | 29 or 30 |

### *Agricultural Education.*

Prof. William R. Hart, Adviser.

| Course. | Credit. |
|---|---|
| Agricultural Education 1, | 3 |
| Agricultural Education 2, | 3 |
| Agricultural Education 3, | 2 |
| Agricultural Education 4, | 3 |
| Agronomy 3, | 3 |
| Dairying 5, | 2 |
| Farm Administration 3, | 3 |
| Poultry Husbandry 1, | 2 |
| Market Gardening 2,<br>Agronomy 5, | 3 |
| Botany 5, | 2 |
| Pomology 1, | 3 |
| | 29 |

Some substitutions of other technical courses for some of the technical courses above mentioned will be made to meet the needs of individual students.

### SUMMARY.

There are four preliminary steps which a student should take in arranging for his major work.

1. Select a major.

2. Confer with major adviser for arrangement of courses, the plan to be approved by adviser in accordance with Rule 5 previously stated.

3. Select courses covering the four semesters of the junior and senior years in such a way that a minimum of 15 credits will be taken in the two Divisions, the Humanities and Rural Social Science; the distribution of all but 3 of these credits may be decided by the student.

4. Choose other courses so that the total number of credits for any semester shall be not less than 16 nor more than 21. (See Rules 2 and 3.)

## C. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of the Book of Rules.]

## DIVISION OF AGRICULTURE.

Professor Foord.

### AGRONOMY.

Associate Professor Haskell, Dr. Brooks, Mr. McDonald.

*Required Course.*

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. Prerequisites, Chemistry 1 and 2. Sophomores; 3 hours. Credit, 3.
Associate Professor Haskell and Mr. McDonald.

*Elective Courses.*

3. Field and Forage Crops. — History, classification, cultivation, harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage and root crops suitable to New England conditions. The work includes lecture, laboratory and field study of these various crops. Prerequisites, Agronomy 1 and Botany 2. For juniors primarily; 1 lecture and 2 laboratory periods. Credit, 3.
Mr. McDonald.

4. Advanced Field Crops. — Commercial production of grain, hay and root crops. Lecture, laboratory, and field study of the purity, quality, and vitality of the seed of these crops and the handling, grading and judging of their products. The work offered will not be confined to New England conditions. Prerequisite, Agronomy 3. For juniors primarily; 2 lectures and 1 laboratory period. Credit 3. Mr. McDonald.

5. Advanced Soils. — A field, laboratory and lecture course on soils; their nature, composition, physical qualities, improvement. Field work, as far as the season allows, consists of detailed soil surveys in different parts of the Connecticut valley; this followed by laboratory work on the physical properties of the soil collected, on the effect of fertilizers on the soil, and on the mixing of fertilizers. Prerequisites, Agronomy 1 and Chemistry 1 and 2. For seniors primarily; 1 lecture period and 1 4-hour laboratory period weekly. Credit, 3. Associate Professor Haskell.

6. Drainage and Irrigation. — A field and lecture course on soil improvement, by drainage and irrigation. As a thesis each man is required, after studying an area of wet or swampy land, to present plans and estimates for its reclamation. Prerequisites, Agronomy 1 and Mathematics 8. Juniors and seniors; 1 lecture period and 1 4-hour laboratory period weekly. Credit, 3. Associate Professor Haskell.

8. Manures and Fertilizers. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. This course is intended for seniors only. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. Brooks and Associate Professor Haskell.

### ANIMAL HUSBANDRY.

Associate Professor McLean, Mr. Quaife.

*Required Course.*

2. Elementary Judging. — A study of the different market classes and grades of horses, cattle, sheep and swine. The purpose of this course is to familiarize beginners with the different classes of stock, and to give them a grounding in live stock judging. Text-book, Craig's "Live Stock Judging." Freshmen; 2 laboratory periods. Credit, 2.
Associate Professor McLean and Mr. Quaife.

*Elective Courses.*

3. Breeds and Types of Live Stock. — A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Text-book, Plumb's "Breeds and Types of Farm Animals." Prerequisite, Animal Husbandry 2. Sophomores; 1 lecture and 2 laboratory periods. Credit, 3. Mr. Quaife.

5. Principles of Breeding. — Text-book, Davenport's "Principles of Breeding." Prerequisite, Zoölogy 1. Juniors; 3 lectures. Credit, 3.
Associate Professor McLean.

6. Live-Stock Management. — The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, breaking to drive, driving, harnessing, casting, and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work. Prerequisite, Animal Husbandry 3. Juniors; 1 laboratory. Credit, 1. Mr. Quaife.

8. Advanced Stock Judging. — This course is designed to equip Animal Husbandry students in the judging of classes of different types of live stock, to strengthen them in the selection of superior sires, and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected largely from this class. Prerequisite, Animal Husbandry 3. Juniors; 2 laboratory periods. Credit, 2.

Associate Professor McLean.

9. Feeding and Management. — A study of the principles of animal nutrition; of the composition and qualities of feeding materials; of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production; a similar study of beef animals and beef production. Text-book, Henry's "Feeds and Feeding." Prerequisite, Animal Husbandry 3. Seniors; 3 lectures. Credit, 3.

Associate Professor McLean and Mr. Quaife.

10. Feeding and Management. — A continuation of Course 9, dealing in a similar manner with horses, sheep and swine. Prerequisite, Course 9. Seniors; 3 lectures. Credit, 3.

Associate Professor McLean and Mr. Quaife.

11. Herd and Stud-book Study. — An advanced course in the study of the breeds of live stock, familiarizing the student with the most productive sires and dams of the various breeds, and the successful lines and methods of breeding. Prerequisites, Animal Husbandry 5 and 8. Seniors; 2 hours. Credit, 2. Associate Professor McLean.

## DAIRYING.

Associate Professor Lockwood, Professor Marshall, Mr. Story, Mr. Coons.

### *Elective Courses.*

1. Milk and Milk Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, test for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems. Two lecture hours and 1 2-hour laboratory period. Credit, 3.

Associate Professor Lockwood.

2. Buttermaking. — A study of separators and cream separation; handling milk and cream for buttermaking; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof. Prerequisite, Course 1; one lecture hour and 2 2-hour laboratory periods. Credit, 3. Associate Professor Lockwood.

3. Dairy Bacteriology. — A study of bacteriology relative to market milk and dairy work. Prerequisites, Courses 1 and 2, Bacteriology 1; 3 2-hour laboratory periods. Credit, 3. Professor Marshall.

4. MARKET MILK AND MILK PRODUCTS. — A study of market milk conditions, extent and development of the business; supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection. The manufacture of milk products other than butter, including cheese, condensed milk, cottage cheese, casein, milk powder, ice cream, etc. Prerequisites, Dairying 1, and Bacteriology 1; two lecture hours and 1 2-hour laboratory period. Credit, 3. Associate Professor LOCKWOOD.

5. DAIRYING. — A course designed primarily for teachers of secondary agriculture. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary buttermaking; proper methods of handling milk and cream; and the relation of market milk to the public health. One lecture hour and 1 2-hour laboratory period. Credit, 2. Associate Professor LOCKWOOD.

## FARM ADMINISTRATION.

Professor FOORD.

### *Elective Courses.*

3. FARM BUILDINGS AND MACHINERY. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisites, Agronomy 1, Animal Husbandry 2, Physics 1. Primarily for seniors; 2 laboratory periods and 1 lecture hour. Credit, 3. Professor FOORD.

4. FARM MANAGEMENT. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3, Animal Husbandry 2 and 3. Primarily for seniors; 2 lecture or recitation hours and 1 laboratory period. Credit, 3. Professor FOORD.

## POULTRY HUSBANDRY.

Associate Professor GRAHAM, Mr. BROWN.

### *Elective Courses.*

1. ELEMENTS OF POULTRY CULTURE. — This course consists of a comprehensive study of poultry-house construction, poultry-house equipment, winter-egg production, types and breeds of poultry. Juniors; 2 lectures. Credit, 2. Associate Professor GRAHAM.

2. ELEMENTS OF POULTRY CULTURE. — This is a continuation of Course 1, treating the subjects of incubation, brooding, care of growing stock, market poultry, including capons, roasters and broilers, and diseases of poultry. Juniors; 2 lectures. Credit, 2. Associate Professor GRAHAM.

3. Poultry Practice Work. — This is a practical laboratory course in poultry carpentry, caponizing, killing and picking; dressing and packing poultry, sorting and preparing eggs for market. Must be preceded or accompanied by Course 1. Juniors; 1 laboratory period. Credit, 1.
Mr. Brown.

4. Incubation and Brooding. — In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg, and the care of sitting hens. This course must be preceded or accompanied by Course 2. Juniors; time to be arranged. Credit, 1 to 3. Mr. Brown.

5. Pen Management. — This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls, and profit and loss; must be preceded or accompanied by Course 1. Juniors; time to be arranged. Credit, 1. Mr. Brown.

6. Poultry Management. — In this course a detailed study of large poultry farms and equipment, such as bone cutters, feed cutters, cramming machines, etc., will be carried on. It includes the laying out and planning of poultry buildings of all kinds, the mating of fowls, and the preparing of birds for exhibition. Attention to poultry diseases and investigation work carried on by experiment stations is prominent in this course. A few good poultry plants will be visited by the class for practical demonstrations. Prerequisites, Courses 1, 2, 3 and 4. Seniors; 2 lectures, 1 laboratory period. Credit, 3. Associate Professor Graham and Mr. Brown.

7. Advanced Poultry Judging. — This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The American Standard of Perfection will be used as a text. Prerequisites, Courses 1, 2, 3, 4 and 5. Seniors; 1 lecture and 2 laboratory periods. Credit, 3. Associate Professor Graham and Mr. Brown.

9. Market Poultry and Poultry Products. — This course includes the study of market classifications of poultry, eggs and feathers; the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course. Prerequisites, Courses 1, 2 and 3. Seniors; 1 lecture or conference period and laboratory periods to be arranged. Credit, 3.
Associate Professor Graham and Mr. Brown.

## DIVISION OF HORTICULTURE.

Professor WAUGH.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

### *Required Course (General).*

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation — as related to the physiology of the plant. Lectures and practicums; Bailey's " Nursery Book " as text in propagation. Sophomores; 2 hours. Credit, 2.

Mr. CHENOWETH.

### *Elective Courses (General).*

3. PLANT MATERIALS. — This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2; 2 lecture periods and 1 laboratory period. Credit, 3.

Professor WHITE.

4. PLANT MATERIALS. — A continuation of Course 3, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions. Prerequisite, Horticulture 3; 2 lecture periods and 1 laboratory period. Credit, 3. Professor WHITE.

6. PLANT BREEDING. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and 1 2-hour laboratory period. [Not given in 1913–14.] Credit, 3.

### FLORICULTURE.

Professor WHITE.

### *Elective Courses.*

1. GREENHOUSE MANAGEMENT. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical operation of glazing concrete, bench construction, bulb culture, greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of green-

house plants by seeds and cuttings. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 4. Professor WHITE.

2. GREENHOUSE MANAGEMENT. — A continuation of Course 1, including also a study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimate of comparative cost of different methods of construction; drafting specifications. Design making and table decorations are considered in this course. Juniors; prerequisite, Floriculture 1; 7 hours as stated under Course 1. Credit, 4. Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms and various conservatory plants; the importation, purchase and growth of bulbous material; the preparation of material for forcing; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisites, Floriculture 1, 2 and 3; 5 hours. Credit, 3. Professor WHITE.

## FORESTRY.

Professor CLARK.

### *Elective Courses.*

1. PRINCIPLES OF FORESTRY. — A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Two lectures; juniors and seniors; not required of students who propose to major in forestry. Credit, 2. Professor CLARK.

3. DENDROLOGY. — During the first part of the semester frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Two 2-hour periods; lectures, recitations, laboratory or field work at option of instructor; juniors. Credit, 3. Professor CLARK.

4. SILVICULTURE. — Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting. Three lectures weekly until May 1; during May and June, one lecture and one 4-hour field period weekly; juniors. Prerequisite, Forestry 3. Credit, 3. Professor CLARK.

5. Forest Mensuration. — Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating. Three lectures; 72 hours of field work; seniors. Credit, 5. Professor Clark.

6. Forest Valuation and Regulation. — Methods of determining the costs of growing timber crops and of arriving at the value of future growth or standing immature growth. Methods of regulating the harvest of crops so as to secure a sustained or annual yield. Prerequisite, Forestry 5; seniors; 3 lectures. Credit, 3 Professor Clark.

### LANDSCAPE GARDENING.

Professor Waugh, Mr. Harrison.

*Elective Courses.*

1. Elements of Landscape Gardening. — Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, plant materials and drawing. Must be followed by Course 2. Juniors; 6 hours a week. Credit, 3. Mr. Harrison.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.

3. General Design. — Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens and parks and private grounds; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either plant materials (Horticulture 3 and 4) or advanced mathematics; must be followed by Course 4; 6 hours. Credit, 3. Professor Waugh.

4. General Design. — As stated under Course 3. Prerequisite, Course 3.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2. Professor Waugh.

6. Architecture. — The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing; 2 hours. Credit, 2. (Alternating with Course 10.) Mr. Harrison.

7. Civic Art. — The principles and applications of modern civic art, including city design, city improvement, village improvement and rural improvement. Prerequisites, Courses 1, 2 and 3; must be followed by Course 8; 6 hours. Credit, 3. Professor Waugh.

8. Civic Art. — As stated under Course 7. Prerequisite, Course 7.

10. Construction and Maintenance. — Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc. Two hours. Credit, 2. (Alternating with Course 6 and not to be given in 1912–13.) Mr. Harrison.

## MARKET GARDENING.

Assistant Professor Yeaw.

### *Elective Courses.*

2. Elements of Market Gardening. — A course designed for an introduction to market gardening as a business. The work consists primarily of actual field experience in handling vegetable crops from seed to maturity. This is supplemented with lectures and text-book, in which a study of methods, soils, fertilization, tillage and management is made. Juniors; 5 hours. Credit, 3. Assistant Professor Yeaw.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of seed growing, selection of varieties, crop management, harvesting, storage and marketing. A study is made of the greenhouse vegetable industry, and considerable time devoted to growing the special forced crops. Some time is given to a systematic study of vegetable description, classification and nomenclature. Collateral reading is required. Seniors; prerequisite, Market Gardening 2; 5 hours. Credit, 3. Assistant Professor Yeaw.

## POMOLOGY.

Professor Sears, Mr. Chenoweth, Mr. Rees.

### *Elective Courses.*

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 4 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 4 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 4 hours. Credit, 3. Mr. Chenoweth.

4. COMMERCIAL POMOLOGY. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 4 hours. Credit, 3. Mr. CHENOWETH.

6. SPRAYING. — A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small fruit plantations. Prerequisites, Horticulture 2, Pomology 1 and 2. Seniors; 3 hours (1 lecture period and 1 laboratory period). Credit, 2.

Professor SEARS.

## DRAWING.

MR. HARRISON.

*Elective Courses.*

1. FREEHAND DRAWING. — Lettering; freehand perspective; sketching from type models, leaves, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink. Juniors; 6 hours. Credit, 3. Mr. HARRISON.

2. MECHANICAL DRAWING. — Inking exercises; geometric problems; projection; intersections, isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry. Juniors; 6 hours. Credit 3.

Mr. HARRISON.

## DIVISION OF SCIENCE.

Professor PAIGE.

### BOTANY.

Professor STONE, Assistant Professor OSMUN, Mr. MCLAUGHLIN, Mr. SMITH.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

#### *Required Course.*

2. GENERAL BOTANY. — The morphology, physiology and classification of plants. This course is fundamental. Its aim is to lay a foundation for the more specialized courses in botany which follow and to provide a general knowledge of the science for those students who will not take further work in the department. This course is prerequisite to all other courses given by the department. Laboratory work consists in the microscopic study of representatives of all the more important plant groups. This phase of the work is almost entirely devoted to morphology and histology, especial attention being given to the structure of higher plants. The lectures aim to amplify and interpret the laboratory work, dealing also with the function (physiology), classification (taxonomy) and ecology of plants. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only 1 lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores: 1 lecture; 3 laboratory periods. Credit, 4.

Assistant Professor OSMUN and Mr. MCLAUGHLIN.

#### *Elective Courses.*

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course may attend the lectures in Course 5. Prerequisite, Botany 2. Primarily for juniors. 1 lecture hour and 3 2-hour laboratory periods. Credit, 4.

Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisites, Botany 2 and 3. Primarily for juniors; 1 lecture hour and 2 2-hour laboratory periods. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. Prerequisite, Botany 2. Primarily for juniors; 1 1-hour lecture and 1 2-hour laboratory period. Credit, 2. Professor STONE, Assistant Professor OSMUN and Mr. MCLAUGHLIN.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Prerequisite, Botany 2. Seniors; students who take this course and continue in botany must take Course 8; 1 lecture period and 3 3-hour laboratory periods. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a technical point of view, and is intended for those students who wish for a more comprehensive knowledge of the phylogenetic relationship of fungi. Laboratory work and lectures. Problems of a practical or technical nature intimately associated with the control of diseases are taken up. Special monographs and more important station literature treating of the life history of fungi, etc., are studied. Prerequisites, Botany 2, 3 and 4. Must be followed by Course 10; seniors; 1 1-hour lecture period and 2 or 3 3-hour laboratory periods. Credit, 4 or 5.
Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9.

11. PLANT PHYSIOLOGY. — This course is largely experimental and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Prerequisite, Botany 2. Must be followed by Course 12; seniors; 1 1-hour lecture period and 3 3-hour laboratory periods. Credit, 5.
Professor STONE and Mr. MCLAUGHLIN.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11.

13. SHADE-TREE MANAGEMENT. — Physiology and pathology of shade trees. This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks

or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Prerequisite, Botany 2. Must be followed by Course 14; seniors; 1 1-hour lecture period and 2 3-hour laboratory periods. Credit, 4. Professor STONE.

14. SHADE-TREE MANAGEMENT. — Physiology and pathology of shade trees. As stated in Course 13. Prerequisite, Course 13.

## GENERAL AND AGRICULTURAL CHEMISTRY.

Professors LINDSEY and WELLINGTON,[1] Associate Professors CHAMBERLAIN and PETERS, Assistant Professor ANDERSON, Messrs. BOGUE, NOYES, FOWLER and GATES.

[The course in chemistry aims to teach accurate observation, logical thinking and systematic and constant industry. It likewise aims to give those students following the several agricultural occupations, or who are preparing themselves for work as teachers and investigators in the other sciences, a knowledge of the subject sufficient to enable them to apply it in their various lines of work. Students taking all of the undergraduate courses and who intend following chemistry as a vocation are prepared for positions as instructors in high schools and colleges, in the agricultural experiment stations, the United States Department of Agriculture, as well as in fertilizer, cattle food, sugar and dairy industries. Students are encouraged to take graduate work leading especially to the degree of M.Sc., and to thus prepare themselves for advanced positions as teachers in the agricultural colleges, as research chemists, and likewise for the more responsible positions connected with the different agricultural industries of the country. A fuller knowledge of the course of instruction will be found by consulting the following outline.]

### *Required Courses.*

1. GENERAL CHEMISTRY. — *The Non-metals.* — An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Kahlenberg's "Outlines of Chemistry" is used as a text. The laboratory work is of two kinds. Those beginning the subject form one division and those who present chemistry for entrance are grouped in other divisions. The advance divisions, in addition to work not usually done in high schools, study simple volumetric quantitative processes such as the determination of the hardness of water, the available oxygen in hydrogen peroxide, the chlorine in soluble chlorides, the oxygen in bleaching powder and the strengths of solutions of acids and bases. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Associate Professor PETERS, Assistant Professor ANDERSON,
Mr. BOGUE and Graduate Assistants.

2. GENERAL CHEMISTRY. — *The Metals.* — A continuation of Course 1. A study of the metals and their compounds. The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate from gas liquor, sulfur and arsenic insecticides and superphosphates, in addition to preparations outlined in Blanchard's "Synthetic Inorganic Chemistry." Attention is paid to the subjects of mass action and colloids. Prerequisite, Course 1. Freshmen; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Associate Professor PETERS, Assistant Professor ANDERSON,
Mr. BOGUE and Graduate Assistants.

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[1] Absent on leave, second semester; courses in charge of Associate Professor Peters.

### *Elective Courses.*

3. QUALITATIVE ANALYSIS. — *Basic.* — A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Gooch and Browning's "Outlines of Qualitative Analysis," with Böttger's "Qualitative Analysis" and Treadwell-Hall's "Qualitative Analysis" for reference. Prerequisite, Course 2; should be taken, particularly, by all intending to follow chemistry as a vocation. Sophomores; lecture, 1 hour; laboratory, 2 hours. Credit, 3. Assistant Professor ANDERSON and Mr. NOYES.

4. QUALITATIVE ANALYSIS. — *Acidic.* — A continuation of Course 3. A large part of the semester is spent in the examination qualitatively of minerals and of agricultural products. Prerequisite, Course 3. Sophomores; lecture, 1 hour; laboratory, 2 hours. Credit, 3.
Assistant Professor ANDERSON and Mr. NOYES.

5. ORGANIC CHEMISTRY. — This course, with Course 6, continues through the junior year. The two courses are designed especially: (1) for those who are looking forward to positions as chemists in agricultural colleges or experiment stations, the United States Department of Agriculture, or similar places, and who need a knowledge of chemistry for itself; and (2) for those who are expecting to enter like positions in other sciences, and who will use their knowledge of chemistry in a secondary way. It consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates, proteins, etc. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and thus for future work in agricultural chemical investigation. Prerequisites, Courses 1, 2, 3 and 4 (courses 3 and 4 will not be required as prerequisites for those majoring in other courses than chemistry). Juniors; those electing Course 5 are expected to elect Course 6. Lectures, 3 hours; laboratory, 4 hours. Credit, 5.
Associate Professor CHAMBERLAIN and Mr. FOWLER.

6. As stated under Course 5.

7. AGRICULTURAL CHEMISTRY. — This course and Course 8 are designed as alternatives for Courses 5 and 6. They are especially intended for those who, having completed Courses 1 and 2, do not care to continue the study of chemistry for itself, but are planning to enter practical agricultural work and desire a further knowledge of chemistry as it is related directly to practical agriculture and agricultural problems. The work is planned in two parts, viz.: *Course 7, Inorganic Agricultural Chemistry*, the study of the general composition, properties and reactions of soils and fertilizers, and in addition to this the study of some of the

more important fungicides and insecticides, and the common materials of construction, such as tile, brick, cements, paints, oils, etc.; and *Course 8, Organic Agricultural Chemistry,* the study of the composition, physiological processes, uses and nutritive value of plants, and the composition and general processes of nutrition and growth of animals; also the study of products related to plants and animals, such as milk, butter, sugar, maple syrup, denatured alcohol, wood pulp, paper, etc. The treatment of the subject in both of these courses is entirely general, avoiding all complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the chemical aspects of agricultural processes and products. Prerequisites, Courses 1 and 2. Juniors; those electing Course 7 are expected to elect Course 8. Lectures, 2 hours; laboratory, 2 hours. Credit, 3.

Associate Professor CHAMBERLAIN and Mr. FOWLER.

8. ORGANIC AGRICULTURAL CHEMISTRY. — As stated under Course 7.

9. QUANTITATIVE ANALYSIS. — Instruction in this course includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals in minerals and industrial products. Aside from teaching accurate observation and care in manipulation, it is intended for those who would learn the exact methods for determining the elements, particularly, in inorganic substances, and is the forerunner of other courses intended to fit men to become expert analysts. Talbot's "Quantitative Chemical Analysis" is used as a text. Prerequisites, Courses 1, 2, 3 and 4. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON and Associate Professor PETERS.

10. AGRICULTURAL CHEMICAL ANALYSIS. — In this course and Course 11 the methods previously studied, and other approved methods, are applied to the examination of agricultural materials. The analysis of fertilizers, insecticides, fungicides and soils is followed by that of cattle foods, dairy products, sugars, starches and allied substances. Prerequisite, Course 9. Juniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5.

Professor WELLINGTON, Associate Professor PETERS.

11. AGRICULTURAL CHEMICAL ANALYSIS. — As stated under Course 10. Prerequisite, Course 10. Seniors; lecture, 1 hour; laboratory, 8 hours. Credit, 5. Professor WELLINGTON and Assistant.

13. PHYSIOLOGICAL CHEMISTRY. — This course is intended to be supplementary to Courses 5 and 6 and Courses 7 and 8. To those who expect to take up scientific work in botany, agronomy, animal husbandry and bacteriology, and who have had Courses 5 and 6, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 5 and 6 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory,

experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion. The course gives additional training in the chemical problems of agricultural experiment station work, especially those connected with investigations in animal and plant nutrition. To those who will not take up scientific lines of work, but will follow practical agriculture, it will give an opportunity for a more detailed study of the chemistry and physiology of problems which were treated generally in Courses 7 and 8. Prerequisites, preferably, Courses 5 and 6 or 7 and 8. Seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Associate Professor CHAMBERLAIN and Mr. FOWLER.

[GENERAL STATEMENT CONCERNING COURSES 12, 14 AND 16. — Each student electing either of these courses will be required to take up and follow out some special line of work, the object being to acquaint him with methods of original inquiry. A single concrete example may be found in a comparative study of the different methods for the determination of the several forms of nitrogen. A thesis may not be required, but frequent consultation of the literature bearing on the subject will be necessary. These courses are valuable for all chemists, and particularly so for those intending to take up experiment station work. A student may choose any one but not two of these separate courses.]

12. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS. — Topics for laboratory study will be assigned to each student. Prerequisite, Course 11. Seniors; laboratory, 10 hours. Credit, 5.
Professor WELLINGTON and Assistant.

14. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY. — In this course, as in Courses 12 and 16, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, digestion and dietary studies, etc. Prerequisites, Courses 5, 6 and 13. Seniors; laboratory, 10 hours. Credit, 5.
Associate Professor CHAMBERLAIN and Mr. FOWLER.

16. SPECIAL WORK IN PHYSICAL CHEMISTRY. — The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work. Prerequisite, Course 15. Laboratory, 10 hours. Credit, 5. Assistant Professor ANDERSON.

15. PHYSICAL CHEMISTRY. — A résumé of general chemistry from the viewpoint of physical chemistry and the application of physical chemistry to agricultural chemistry. Prerequisite, Course 9. Juniors and seniors; lectures, 2 hours; laboratory, 2 hours. Credit, 3.
Assistant Professor ANDERSON.

18. HISTORY OF CHEMISTRY. — An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at more length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course. [Not given in 1912–13.] Seniors; lectures, 2 hours. Credit, 2. Professor WELLINGTON.

## ENTOMOLOGY.

Professor FERNALD, Associate Professor CRAMPTON, Assistant Professor GATES, Mr. MARTIN, Mr. DAVIS.

### *Elective Courses.*

1. GENERAL AND ECONOMIC ENTOMOLOGY. — Course 1 comprises a general introduction to the study of insects, including studies on their structure as applied to their identification; the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collections, and methods for their control. The most important insecticides and their preparation and application are also treated. Students electing Course 1 are expected to take Course 2. Juniors; 3 lecture periods. Credit, 3. Professor FERNALD.

2. GENERAL AND ECONOMIC ENTOMOLOGY. — A continuation of Course 1, with laboratory and field work on methods of collecting, preserving and studying insects and their work. Juniors; 2 laboratory or field periods. Credit, 3. Professor FERNALD.

3. ADVANCED ENTOMOLOGY. — This course is subdivided, the time spent on the various subdivisions differing somewhat according to the particular needs of those taking it; and it is to a large degree given in the form of individual instruction, special attention being paid to the pests attacking the particular crops in which the student is most interested. The student may specialize in fruit pests, market-garden pests, greenhouse pests, field crop pests, etc., to a large extent, in accordance with his plans for future work.

*A. Morphology.* — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

*B. Histology.* — Lectures on the internal anatomy and histology of the various organs, with particular reference to those affected by the various insecticides.

*C. Insecticides and Apparatus.* — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects; tests for detecting adulterations; comparative tests of nozzles and other apparatus; and a study of other methods of insect control, together with laboratory work.

*D. Coccidology.* — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

*E. Bibliography.* — Studies of the various entomological publications and of the methods of finding the literature on any insect.

*F. Special Studies.* — In these studies the insects most closely related to the future occupation of the student will receive attention. The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing Course 3 are expected to take Course 4; 1 1-hour lecture period and 3 2-hour laboratory or field periods. Credit, 4.

Professor FERNALD, Associate Professor CRAMPTON, Mr. MARTIN.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

5. FOREST INSECTS. — A study of insects injurious to forest trees and of methods for their control, with laboratory and field work on these insects, and a study of what has been published about them. Seniors; prerequisites, Entomology 1 and 2; 1 lecture and 2 2-hour laboratory or field exercises. Credit, 3. Professor FERNALD.

8. BEEKEEPING. — This course comprises a general consideration of the biology of the honey bee and of practical beekeeping. Some topics covered are: phylogeny, life history, general behavior and instincts, structure, products, relations of bees to plants and the honey flora. The course aims particularly to afford first-hand, practical experience with bees, to the end of enabling their proper maintenance for any purpose, horticultural, educational or apicultural. Bee diseases, a thorough understanding of which is fundamental to the industry, are considered. So far as possible the work is made individual in constructing materials and apparatus. Juniors; seniors may elect. Courses 1 and 2 form a desirable preparation; 2 lectures; 1 2-hour laboratory period. Credit, 3.

Assistant Professor GATES, Mr. DAVIS.

[10.[1] ADVANCED BEEKEEPING. — This course deals with the advanced and special problems of the beekeeper. Besides considering those difficulties which at present confront the industry, subjects necessarily of limited treatment in the previous course are expanded for the development of particular technique and manipulation. Apiary management and the principles of queen rearing are practiced in accord with the season. The course should further qualify for apicultural instruction, inspection service, and afford familiarity with the special literature and method needed in investigation and research. The policy of individual instruction will be contained in so far as practicable. Primarily for seniors, but juniors may elect; prerequisite, Course 8; 1 lecture, 1 laboratory period. Credit, 2. Assistant Professor GATES.]

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[1] The announcement of this course is made provisionally.

### MATHEMATICS AND CIVIL ENGINEERING.

Professor OSTRANDER, Mr. DUNCAN, Mr. MACHMER, Mr. PARSONS.

*Required Courses.*

1. HIGHER ALGEBRA. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Crathorne's "College Algebra." Freshmen; 3 hours a week. Credit, 3. Mr. MACHMER and Mr. PARSONS.

2. HIGHER ALGEBRA. — As stated under Course 1. Mr. MACHMER.

3. SOLID GEOMETRY. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours a week. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY (in Charge of Department of Physics). — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3. Professor HASBROUCK and Captain MARTIN.

*Elective Courses.*

6. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3. Mr. DUNCAN and Mr. PARSONS.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Fine and Thompson's "Coördinate Geometry." Prerequisites, Mathematics 1, 2, 3 and 4. Primarily for juniors; 3 hours a week. Credit, 3. Professor OSTRANDER.

8. DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 3, 4 and 7. Primarily for juniors; 5 hours. Credit, 5. Professor OSTRANDER.

10. ADVANCED SURVEYING. — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. [Not given in 1912–13.] Text-book and lectures; 6 hours. Credit, 5.
Professor OSTRANDER.

11. HYDRAULICS AND SANITARY ENGINEERING. — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. [Not given in 1912–13.] Text-book and lectures; 3 hours. Credit, 3. Professor OSTRANDER.

12. ELEMENTARY STRUCTURES. — An elementary course in roofs and bridges. Text-book and lectures; 6 hours. [Not given in 1913–14.] Credit, 5. Professor OSTRANDER.

13. MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION. — Text-book and lectures; 4 hours. [Not given in 1913–14.] Credit, 3. Professor OSTRANDER.

15. APPLIED MECHANICS. — A course in applied mechanics, based on the calculus, with problems. Text-books and lectures. Prerequisites, Mathematics 7, 10; 3 hours. Credit, 3. Professor OSTRANDER.

## MICROBIOLOGY.

Professor MARSHALL.

[The program of courses in the recently established department of microbiology has not been completed. Work will be outlined in pathology, bacteriology, etc., but only the course in dairy bacteriology (Dairying 3) has yet been offered.]

3. DAIRY BACTERIOLOGY. — A study of bacteriology relative to market milk and dairy work. Prerequisites, Courses 1 and 2, and Bacteriology 1 (see Veterinary science); 3 2-hour laboratory periods. Credit, 3.
Professor MARSHALL.

## PHYSICS.

Professor HASBROUCK, Captain MARTIN, Mr. BUTMAN.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

### *Required Course.*

1. GENERAL PHYSICS. — General physics covers mechanics of solids, mechanics of fluids, wave motion and heat. These topics are chosen for the required work because they are regarded as the most fundamental of all, and there is no part of the work in physics more necessary for the student who plans to take up practical farming. Course given by text-book and lectures. Sophomores; 4 hours' class-room work and 1 laboratory period. Credit, 5. Professor HASBROUCK and Mr. BUTMAN.

*Elective Courses.*

2. General Physics. — Electricity and light. Text-book, lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3. Mr. Butman.

3. Optical Instruments and Light. — Three-hour lecture course open to juniors and seniors; 3 hours. Credit, 3. Mr. Butman.

4. Electricity and Heat. — Three-hour lecture and laboratory course open to juniors and seniors; 3 hours. Credit, 3. Mr. Butman.

[Mathematics 4 (trigonometry) is, for convenience of grouping, listed under Mathematics, although in charge of the Department of Physics.]

## VETERINARY SCIENCE.

Professor Paige, Assistant Professor Gage.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

*Elective Courses.*[1]

1. Introductory Bacteriology. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; 3 2-hour laboratory exercises. Credit, 3. Professor Paige and Assistant Professor Gage.

2. Bacteriology. — A continuation of Course 1, taking up more advanced problems.

3. Veterinary Science. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor Paige.

4. Veterinary Science. — As stated under Course 3.

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[1] Revision of the plan of courses, to be in effect in 1913–14, is announced.

## ZOÖLOGY AND GEOLOGY.

Associate Professor Gordon, Mr. Parker.

### Zoölogy.

*Required Course.*

1. Animal Morphology. — This course presents the underlying principles of biology and the zoölogical part of an introductory course. Laboratory dissection and lectures. Sophomores; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Associate Professor Gordon.

*Elective Courses.*

3. Comparative Invertebrate or Vertebrate Zoölogy. — These are parallel courses running throughout the year and are scheduled for the same hour. The student may elect one or the other, but not both in the same year. Comparative invertebrate zoölogy is intended primarily for future students in entomology, but is open to any one. Vertebrate zoölogy presents the comparative morphology of vertebrate forms. Parker & Haswell's "Text-book of Zoölogy," Vol. I., is required for invertebrate zoölogy, and Vol. II. for vertebrate zoölogy. Primarily for juniors; prerequisite for these courses, Course 1, or its equivalent; 1 lecture hour and 2 2-hour laboratory periods. Credit, 3. Associate Professor Gordon.

4. Comparative Invertebrate or Vertebrate Zoölogy. — Continuation of Course 3. One lecture hour and 2 2-hour laboratory periods. Credit, 3. Associate Professor Gordon.

5. Advanced Zoölogy.[1] — A course in animal parasites is offered to seniors. This course is a survey of this special field, with laboratory dissection, lecture work and outside reading. Not open to fewer than three students. Prerequisites, Course 1 and Course 3 in comparative invertebrate zoölogy; 2 1-hour periods, or their equivalent and 3 2-hour periods. Credit, 5. Associate Professor Gordon.

6. Advanced Zoölogy.[1] — Course 5, continued. One 1-hour period and 2 2-hour periods. Credit, 3. Associate Professor Gordon.

Graduate Courses. — See "Graduate School."

### Geology.

*Elective Course.*

2. Elementary Geology. — Rock-forming minerals; rock types; rock weathering; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; 1 1-hour period and 2 2-hour periods. Credit, 3. Associate Professor Gordon.

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[1] Courses 5 and 6 are also available as a minor for the degrees of master of science or doctor of philosophy.

## DIVISION OF THE HUMANITIES.

Professor SPRAGUE.

### ECONOMICS AND SOCIOLOGY.

Professor SPRAGUE.

*Required Course.*

1. POLITICAL ECONOMY. — An introductory course. A study of the nature and scope of economics; the evolution and organization of the present economic system, the principles of production, exchange and consumption. This course will take up such topics as value, rentals, population, labor and its problems, capital, interest and profits, systems and factors of production, tariffs and commerce. Students will be called upon to analyze industrial plants in actual operation. Text-books, lectures and general discussions; a required course, but it may be taken in either junior or senior year; 3 hours. Credit, 3. Professor SPRAGUE.

*Elective Courses.*

2. INDUSTRIAL PROBLEMS. — A course in the most important industrial problems of the day, covering the methods of organizations of labor and capital, systems of industrial remuneration, means of securing industrial peace, legal status of labor unions and their activities, protective legislation for workmen and employers, the problems of immigration, the sweated industries, prison labor, child labor and industrial education. Text-book, with collateral readings, lectures and discussions; 3 hours. Credit, 3.
Professor SPRAGUE.

3. SOCIAL INSTITUTIONS AND SOCIAL PROBLEMS. — This course is devoted to the study of the social institutions, such as the family, the church, State and property; and to such current social problems as divorces, race suicide, crime and prison reform, poverty and its relief, social effects of low wages, child labor, overwork, immigration and congestion of population. The later weeks of the semester will be given to a short introduction to sociological theory. The correctional and charitable institutions of Massachusetts will be studied in considerable detail. Readings, lectures, papers; 3 hours. Credit, 3. Professor SPRAGUE.

4. MODERN SOCIAL REFORM MOVEMENTS. — The history of property and its vital issues in modern times. The socialistic systems, anarchy and communism. Systems of workingmen's insurance in Europe and America, and other methods of relief from the chances of life. Educational reforms, in process, to meet the demands of a new age, and legislative remedies for the evils of social change and maladjustment. The crisis of Christianity under modern capitalized industrialism. These topics indicate the nature of the subjects studied. This course follows Economics 3. Three hours. Credit, 3. Professor SPRAGUE.

5. Public Finance, Money and Banking. — This course follows Economics 1. It will take up taxation and the various systems for collecting public revenue in Europe and America, with the problems involved; the history of money and the systems of banking and finance now in operation; the causes and problems of economic crises and depressions; the currency problems of the United States. Readings, lectures and discussions; 3 hours. Credit, 3. Professor Sprague.

6. Economic History. — This course will be divided between the economic history of Europe and that of America. An outline history will be followed with special study of selected epochal periods and important topics. Three hours. Credit, 3. Professor Sprague.

8. Anthropology; the History of Human Civilization. — The evolutionary origin and history of man; characteristics of primitive men, departure from the animal status, and the beginnings of civilization; development of industries, arts and sciences; the growth of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern conditions, will constitute the subject matter of the course. Three hours. Credit, 3. Professor Sprague.

## HISTORY AND GOVERNMENT.

Associate Professor Eyerly, Mr. Holcomb.

*Elective Courses.*

1. Elements of Political Science. — Nature and scope of political science; origin and evolution of the State; systems of government in the principal European States; organization and working of the national and of the State governments of the United States; relation of government to political parties and to public opinion; the functions of government as related to labor and commerce. Three hours. Credit, 3.
Associate Professor Eyerly.

2. Local Political Institutions. — A comparative study of the organization, functions and achievements of country and city groups, especially as these are concerned with such matters as taxation, finance, licenses, franchises, public ownership, highways, transportation and communication, water supply, fire protection, public lighting, markets, food inspection, garbage and sewage disposal, infectious diseases, housing conditions, police force, parks and playgrounds, libraries, schools, care of dependents. Three hours. Credit, 3. Associate Professor Eyerly.

3. The History of New England. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fulness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading; 3 hours. Credit, 3. Mr. Holcomb.

5. The History of Ideals. — This course treats history from the idealistic rather than from the economic, point of view. It attempts to define the great ideals which have impelled some of the most important social, political, esthetic, scientific, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. Christianity, including monasticism, modern Catholicism and Protestantism; medieval art and architecture; the modern scientific movement; and social and political democracy will be treated historically from this point of view. Lectures and reading; 3 hours. Credit, 3. Mr. Holcomb.

## LANGUAGES AND LITERATURE.

Professor Mills.

## LANGUAGES AND LITERATURE: ENGLISH, JOURNALISM AND PUBLIC SPEAKING.

Associate Professor Neal, Professor Lewis, Assistant Professor Smith, Mr. Wattles, Mr. Prince, Miss Goessmann.

### English.

*Required Courses.*

1, 2. Freshman English. — Composition; introduction to literature. Recitations, laboratory practice and lectures; theme writing; conferences. Text-book and laboratory manual, Neal's "Thought-building in Composition." Freshmen; 4 hours. Credit, 4.

Associate Professor Neal, Assistant Professor Smith, Mr. Wattles, Mr. Prince.

3, 4. Sophomore English. — Composition; literature. Prerequisite, Courses 2 and 3 respectively; sophomores; 2 hours. Credit, 2.

Professor Lewis and Miss Goessmann.

*Elective Courses in English Language and Literature.*

7. Expository Writing. — The principles of exposition, with exercises in composition. Subjects will be largely found in current events and contemporary thought, and treated editorially. A foundation course in more advanced composition, primarily for juniors but open to seniors; advised for those who plan to take Course 8. First given in 1912–13. Two hours, with a third hour at the option of the instructor. Credit, 2.

Mr. Wattles.

8. Expository Writing. — The principles of exposition with especial reference to technical writing, including the writing of bulletins; some attention also to the more popular exposition of scientific facts. Primarily for juniors but open to seniors. First offered in 1912–13. Two hours, with a third hour at the option of the instructor. Credit, 2.

Mr. Wattles.

9, 10. Cultural Reading. — Not given in 1912–13.

13. ENGLISH WRITERS AND THOUGHT. — Studies, laboratory problems, readings, and reports in some period of English literature. Three hours. Credit, 3. Assistant Professor SMITH.

14. ENGLISH WRITERS AND THOUGHT. — As in Course 13. Three hours. Credit, 3.

15. PROSE MASTERS OF THE NINETEENTH CENTURY. — A sympathetic study of the writings of Ruskin, Carlyle, Newman, Arnold and Stevenson. Junior and senior course; 3 hours. Credit, 3. Professor LEWIS.

16. POETS OF THE VICTORIAN AGE: BROWNING, TENNYSON AND ARNOLD. — This course will deal especially with the ethical and religious ideals of these poets as expressed in their most serious poems. Junior and senior course; 3 hours. Credit, 3. Professor LEWIS.

17. ADVANCED COMPOSITION AND LITERATURE. — The reading and study of writings that are typical of literary style or form, especially in description and narration, and the writing of exercises involving problems of the same general sort as those illustrated by the readings. A good deal of fiction will probably be read, of which more or less will be found in the novels and short stories of our own day. On this study will be based the work in composition. Primarily for seniors but open to juniors. Two hours, with a third hour at the option of the instructor. Credit, 2.

Associate Professor NEAL.

18. ADVANCED LITERATURE. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types. Three hours. Credit, 3.

Associate Professor NEAL.

### JOURNALISM.

[The courses in journalism emphasize rural journalism. They aim to acquaint the student with the elementary problems and theory of journalism as a profession or vocation, and to exercise him, as far as conditions permit, in the commoner aspects of journalistic work, such as news-gathering, news-writing, desk-editing and editorial writing. By rural journalism is meant the application of journalistic principles in getting and suitably presenting material adapted to the non-urban rather than to the urban or metropolitan reader, so far as their interests are distinct. This includes agricultural journalism, but is by no means confined to that. Members of the classes supply, under the head "The Bay State Ruralist," a feature page for the "Springfield Sunday Union." Members of all classes may be required to turn in copy regularly for such disposition as the instructor may determine, and must have free time for covering stories. Students wishing to proceed beyond elementary study are urged to consult with the instructor before making their election in other subjects for the junior-senior years, in order that the most helpful program of work may be arranged.]

#### *Elective Courses.*

1. INTRODUCTION TO JOURNALISM. — The foundation conceptions and aims of journalism; practice in the simple forms of journalistic writing. Prerequisite to all other work in journalism, and valuable also to students

preparing for practical farming, agricultural or general science, rural education, etc., as a vocation. Two hours, with a third hour at option of the instructor. Credit, 2.
Associate Professor NEAL, Assistant Professor SMITH.

2. REPORTING. — News-gathering and news-writing. This includes the gathering and presentation of industrial and agricultural information, campus news or other stories, as may be directed. Courses 1 and 2 are the foundation courses in journalism. Students admitted to 2 who have not had 1 will be required to do extra work. Two hours, with a third hour at the option of the instructor. Credit, 2.
Associate Professor NEAL.

3. JOURNALISTIC PRACTICE. — The gathering and preparation of material for publication. The class may be organized as a staff. Prerequisite, course 1 or its equivalent. Two hours, with a third hour at the option of the instructor. Credit, 2. Associate Professor NEAL.

4. JOURNALISTIC PRACTICE. — As stated under Course 3.

5. ADVANCED JOURNALISTIC PRACTICE. — Informal; students will be assigned work as editorial assistants or writers, or otherwise employed in some form of journalistic activity. Study of particular forms of journalistic writing, of special subjects and their journalistic presentation, of particular kinds of periodical, or of current topics may be directed, and the presentation of a thesis may be required. Hours to be arranged. Two hours. Credit, 1. Associate Professor NEAL.

6. ADVANCED JOURNALISTIC PRACTICE. — As stated under Course 5.

### PUBLIC SPEAKING.

#### *Required Courses.*

1. FRESHMAN PUBLIC SPEAKING. — Freshman public speaking is required in either the first or the second semester at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Some attention is given to breath control and development of speaking voice, considerable attention to pronunciation and enunciation, and a large amount of attention to the preparation and delivery of extempore speeches. Text-book, Shurter's "Extempore Speaking," supplemented by lectures and discussions. Freshmen; 1 hour. Credit, 1. Mr. PRINCE.

2. FRESHMAN PUBLIC SPEAKING. — As stated under Course 1. Required of all freshmen who are not assigned to take Course 1.

8. OCCASIONAL ORATORY. — Exercises for voice and gesture; a study of the elements of vocal expression and action; speeches on assigned topics; prescribed reading; the preparation and delivery of a formal oration or two. It is especially recommended for those who desire to enter the Flint contest. Two hours. Credit, 2. Assistant Professor SMITH.

## LANGUAGES AND LITERATURE: GERMAN.

Assistant Professor ASHLEY, Mr. JULIAN.

### *Required Courses.*

1. ELEMENTARY GERMAN. — Grammar and composition; the reading of short stories, poems, plays, etc. Especial attention is given to oral questioning and answering in German, and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. JULIAN.

2. ELEMENTARY GERMAN. — As stated under Course 1. Prerequisite, Course 1.

3. INTERMEDIATE GERMAN. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar and dictation in German; outside readings. Required of freshmen who present German for entrance and do not take French. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Assistant Professor ASHLEY.

3A. INTERMEDIATE GERMAN. — Rapid reading of prose works, such as Sudermann's "Frau Sorge," and dramas, such as "Wilhelm Tell" and "Die Journalisten." Required of sophomores who took Courses 1 and 2 as freshmen. Mr. JULIAN.

4. INTERMEDIATE GERMAN. — As stated under Course 3. Prerequisite, Course 3.

4A. INTERMEDIATE GERMAN. — As stated under Course 3A. Open to students who have completed German 3A; 3 hours. Credit, 3.

5. ADVANCED GERMAN. — Literary study of the classicists, — Schiller's "Wallenstein," Lessing's "Nathan der Weise," Goethe's "Iphigenia," etc.; collateral readings in German and class-room reports. Conducted in German. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Assistant Professor ASHLEY.

### *Elective Courses.*

6. ADVANCED GERMAN. — As stated under Course 5. Sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Assistant Professor ASHLEY.

7. MODERN GERMAN. — Reading of articles from the best modern German periodicals, such as "Ueber Land und Meer;" conversation and composition work based on text. "Ferien in Deutschland," prepared by instructor; 3 hours. Credit, 3. Assistant Professor ASHLEY.

8. MODERN GERMAN. — As stated under Course 7.

9. Scientific German. — Reading of modern magazine articles and works in German of a scientific nature. Different work assigned according to needs of individual students. Open to juniors who have completed Course 4A or more advanced work. Three hours. Credit, 3.
Assistant Professor Ashley.

10. Scientific German. — As stated under Course 9.

11. German Literature. — Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust," and one modern typical drama. Prerequisite, Course 6 or 10.
Assistant Professor Ashley.

12. German Literature. — As stated under Course 11.

### LANGUAGES AND LITERATURE: FRENCH.

Assistant Professor Mackimmie, Mr. Harmount.

1, 2. Elementary French. — The essentials of grammar are rapidly taught. Thieme and Effinger's "French Grammar" will be used during the first semester. A large amount of reading is required. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4. Mr. Harmount.

3. Intermediate French (third year). — Training for rapid reading; the reading of a number of short stories, novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Assistant Professor Mackimmie, Mr. Harmount.

4. Intermediate French. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Assistant Professor Mackimmie.

5. Advanced French (fourth year). — A reading course; Balzac's "Eugenie Grandet" and "Le Père Goriot" and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3. Assistant Professor Mackimmie, Mr. Harmount.

*Elective Courses.*

6. Advanced French (fourth year). — A general view of the history of French literature; Kastner and Atkins' "History of French Literature." Several plays of the great classical dramatists will be read. Individual

conferences on outside reading selected by the student. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3. Assistant Professor MACKIMMIE.

7, 8. SCIENTIFIC FRENCH. — This course is planned to meet the requirements of the individual student and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read. Three hours. Credit, 3. Mr. HARMOUNT.

9, 10. MODERN FRENCH LITERATURE. — The outline is intended as a suggestion. The exact subject matter of the course will be determined when the men are enrolled. The object of this course is to give an introduction to recent movements in French literature. In the drama, readings from Augier, A. Dumas, fils, Delavigne; in the novel, from Flaubert, the de Goncourts, Zola; in criticism, from Taine, Renan, Sainte-Beuve; for the literary history of the period Lanson's "Histoire de la Litterature Française." Prerequisite, the required French. Juniors or seniors; 3 hours. Credit, 3. Assistant Professor MACKIMMIE.

## LANGUAGES AND LITERATURE: SPANISH.

Assistant Professor MACKIMMIE.

### *Elective Courses.*

1. ELEMENTARY SPANISH. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors or juniors; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor MACKIMMIE.

2. MODERN SPANISH AUTHORS. — Reading from modern Spanish novel and drama. Prerequisites, Course 1. Seniors or juniors; open upon arrangement to other students; 3 hours. Credit, 3.
Assistant Professor MACKIMMIE.

## LANGUAGES AND LITERATURE: MUSIC.

Assistant Professor ASHLEY.

### *Elective Courses.*

1. HISTORY AND INTERPRETATION OF MUSIC. — History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school — Bach, Händel, Haydn, Gluck and Mozart. One hour. Credit, 1. Assistant Professor ASHLEY.

2. HISTORY AND INTERPRETATION OF MUSIC. — A continuation of Course 1. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera. The Modern school and Modern composers. One hour. Credit, 1.
Assistant Professor ASHLEY.

## DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

### AGRICULTURAL ECONOMICS.

Associate Professor Cance.

*Required Courses.*

2. Agricultural Industry and Resources. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Associate Professor Cance.

*Elective Courses.*

4. Elements of Agricultural Economics. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; determination of price; speculation; problems of land tenure and land values; taxation of land values; the maintenance of the economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Associate Professor Cance.

5. Historical and Comparative Agriculture. — Recommended to students in journalism or education. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Seniors and juniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Associate Professor Cance.

6. Co-operation in Agriculture. — The course contemplates a somewhat comprehensive view of the history, principles and business relations of agricultural organization for profit. (1) A survey of the development and progress, the methods and economic results, of the farmers' organizations and great co-operative movements in the past; (2) the phases of business organization of agriculture abroad, and the present aspects and

tendencies in the United States;' (3) the principles underlying successful co-operative endeavor among farmers, and practical working plans for co-operative associations, with particular reference to the marketing of perishable products. Lectures, text, assigned reading and practical exercises; 2 or 3 hours. Credit, 2 or 3. Associate Professor CANCE.

7. PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm values, special problems, — cost of producing farm products, farm labor in New England, immigration, shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors and juniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 or 3 hours a week. Credit, 2 or 3.
Associate Professor CANCE.

8. THE AGRICULTURAL MARKET. — This course contemplates a study of the forces and conditions which determine the prices of farm products, and the mechanism, methods and problems concerned with transporting, storing and distributing them. Such topics as supply and demand, course of prices, transportation by freight, express and trolley, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market, direct sales and the like will be taken up. The characteristics and possibilities of the New England market will be given special attention. Lectures, readings, assigned studies and field work. [Not offered in 1913–14.] Juniors and seniors; 2 or 3 hours a week. Credit, 2 or 3. Associate Professor CANCE.

9. SEMINAR. — Research in agricultural economics and history: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.
Associate Professor CANCE.

10. SEMINAR. — As stated in Course 9.

## AGRICULTURAL EDUCATION.

Professor HART, Associate Professor MORTON.

### *Elective Courses.*

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3. Professor HART.

2. Vocational Education (History and Philosophy). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3.
Professor Hart.

3. Rural School Problems. — A study of agricultural education; the theory and practice of teaching; school organization and methods of instruction; the place and function of agriculture in the course of study. Primarily for those who have had Course 1 or 2; 2 hours. Credit, 2.
Professor Hart.

4. Rural School Problems. — Designed primarily for those who intend to teach; may be taken in connection with Course 3. The work consists of the selection and review of such parts of the courses in agriculture, horticulture and the biological and physical sciences as are adapted to the work of the public schools; planning, and practical work in school gardens; decoration of school grounds; equipment and conduct of playgrounds. One lecture period, 2 two-hour laboratory periods. Credit, 3.
Professor Hart, Associate Professor Morton.

5. Seminar in Education. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: rural school supervision, and rural school surveys, and secondary school agriculture. Seniors and graduate students; 2 hours. Credit, 2.
Professor Hart.

6. Seminar in Education. — As stated under Course 5.

## RURAL SOCIOLOGY.

Associate Professor Eyerly, President Butterfield, Professor Hart, Mr. Holcomb.

### *Elective Courses.*

2. The Rural Community. — A broad survey of the field of rural sociology, including such topics as the movements of the rural population, the social conditions and life of rural people, the influence of rural life, the description of the various social institutions of the rural community, an analysis of the fundamental problems of rural life, and the means of developing and redirecting the life of the rural community. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President Butterfield and Associate Professor Eyerly.

3. The Literature of Rural Life. — A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities; 3 hours. Credit, 3.
Mr. Holcomb.

4. Rural Law. — The work of this course will cover such points as land titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures, and class discussions; 1 hour. Credit, 1. Professor Hart.

5. The Social Conditions of the Rural People. — Composition of the rural population; vital statistics; nature, extent and causes of diseases and accidents; health agencies of control; extent and causes of delinquency and dependency; conditions of temperance, of sexual morality and family integrity; child labor; woman's work and position; relation of employer to employee; standard of living; size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics; 3 hours. Credit, 3. Associate Professor Eyerly.

6. Sociological Aspects of Co-operation among Farmers. — An historical sketch of the origin, extent and success of co-operation among farmers in the various European countries and in the United States; personal qualities and social conditions necessary to successful co-operative endeavor; the various forms of co-operative organization viewed in their industrial, intellectual and moral aspects; the influence of co-operation on the farmer's individualism, conservatism, self-help, thrift, contentment and on agrarian legislation, scientific agriculture and farm labor; the relation of co-operation to neighborhood life, to community pride and loyalty, to further associated effort, to class stability, solidarity and status; the demand of co-operation for a new type of leadership; the relation of co-operation to socialism and the competitive system; 3 hours. Credit, 3. [Given in 1912–13; not given in 1913–14.]

Associate Professor Eyerly.

7. Rural Institutions. — A study of the organized agencies by which rural communities carry on their various forms of associated life; particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment. Special attention given to the rural family and the rural church; 3 hours. Credit, 3. Associate Professor Eyerly.

8. The State and the Farmer. — A general survey of political organizations and movements among farmers in foreign countries and their influence in shaping agrarian legislation; the character, extent and results of foreign State aid to the farming class; political movements among farmers in the United States; "Granger" legislation; relation of the Department of Agriculture, State boards of agriculture, agricultural colleges and experiment stations, postal system, railway commissions, highway commissions, public health agencies, etc., to rural welfare; 3 hours. Credit, 3. Associate Professor Eyerly.

9. The Social Psychology of Rural Life. — Characteristics of the rural mind; character of hereditary and environmental influences; nature and effects of face-to-face groups; psychological effects of isolation, rela-

tive security and freedom from strain; relation of contact with nature, of control over immediate environment, of family co-operation and of neighborhood life to self-control, self-expression, sympathy, service and leadership; nature and effects of fashion, conventionality and custom; character of discussion and public opinion, and their relation to class feeling and organization; relation of individualism, conservatism and homogeneity to crowd phenomena and progressive democracy; 3 hours. Credit, 3.
Associate Professor EYERLY.

10. FARMERS' ORGANIZATIONS. — The history, purposes and achievements of the Grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the nature, scope, methods and history of local, State and national associations formed about some farm product or special farm interest, *e.g.*, dairying, horticulture, stock breeding, forestry; their influence on "better farming, better business, better living;" their influence in forming a class consciousness and in shaping legislation; need of federation; 3 hours. Credit, 3. Associate Professor EYERLY.

11. SOCIOLOGICAL ASPECTS OF CURRENT AGRICULTURAL QUESTIONS. — Government conservation policy, roads, railways, trolleys, telephones, postal service, credit facilities, taxation, pure food laws, tenancy and ownership, intensive versus extensive farming, agricultural labor; 3 hours. Credit, 3.
Associate Professor EYERLY.

13. SEMINAR. Associate Professor EYERLY.

## GENERAL DEPARTMENTS.

### MILITARY SCIENCE AND TACTICS.

Captain Martin, Mr. Parsons.

[The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical (drill) courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the " Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

The required uniform is of khaki, costing about $15. It is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms is prohibited, unless the consent of the military instructor be obtained.]

#### *Required Courses.*

1. Freshman Drill. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin, Mr. Parsons.

2. Freshman Drill. — As stated under Course 1. Freshmen; second semester after spring recess; 3 hours. Credit, 1.

3. Sophomore Drill. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess; 3 hours. Credit, 1. Captain Martin, Mr. Parsons.

4. Sophomore Drill. — As stated under Course 3. Sophomores; second semester after spring recess; 3 hours. Credit, 1.

5. Sophomore Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the company, "Manual of Guard Duty," "Small Arms Firing Regulations." Sophomores; 1 hour. Credit, 1.
Captain Martin.

6. Sophomore Tactics. — As stated under Course 5. Sophomores; 1 hour. Credit, 1.

7. Junior Drill. — Practical instruction as before, target practice, in gallery and on the range. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin, Mr. Parsons.

8. Junior Drill. — As stated under Course 7. Juniors; second semester after spring recess; 3 hours. Credit, 1.

9. Junior Tactics. — Theoretical instruction in "Infantry Drill Regulations," to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; "Manual of Field Service Regulations;" preparation of reports; returns, muster-rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Juniors; 1 hour. Credit, 1. Captain Martin.

10. Junior Tactics. — As stated under Course 9. Juniors; 1 hour. Credit, 1.

*Elective Courses.*

11. Senior Drill. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 11 and 12 must take the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors; first semester until Christmas recess; 3 hours. Credit, 1.
Captain Martin.

12. Senior Drill. — As stated under Course 11. Seniors; second semester after spring recess; 3 hours. Credit, 1.

## PHYSICAL EDUCATION AND HYGIENE.

Assistant Professor HICKS, Mr. FITZMAURICE.

### HYGIENE.

*Required Courses.*

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1.
Assistant Professor HICKS.

### PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering.]

*Required Courses.*

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit (given only for Course 2), 1.
Assistant Professor HICKS and Mr. FITZMAURICE.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit (given only for Course 4), 1.

Assistant Professor HICKS and Mr. FITZMAURICE.

4. GRADED GYMNASTICS. — As stated under Course 3.

5. GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit (given only for Course 6), 1. Assistant Professor HICKS and Mr. FITZMAURICE.

6. GYMNASTICS. — As stated under Course 5.

*Elective Courses.*

7. TRAINING COURSE. — Leadership class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 1. Assistant Professor HICKS.

8. TRAINING COURSE. — As stated under Course 7.

# THE GRADUATE SCHOOL.

# THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

CHARLES E. MARSHALL, Ph.D., Director of the Graduate School and Professor of Microbiology.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

## ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

### NATURE AND METHODS OF GRADUATE WORK.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

### THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

Two copies of each thesis in its final form, ready for the printer, must be submitted to the director of the school before the candidate for the degree may take the required oral examination. One of the said copies, to contain all drawings, is to be retained as an official copy by the said director, and the other by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis. When printed, three copies of each thesis must be deposited with the director of the graduate school and three copies with the department in which the work was carried out.

All theses become the property of the department in which they are prepared.

### FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

### DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.
2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.
3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.
4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.
5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.
2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.
3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.
4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.
5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

### COURSES FOR DEGREE OF MASTER OF SCIENCE.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.
Zoölogy (minor only).

### COURSES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zoölogy.

### GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

#### *Major Courses.*

BOTANY. — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of Botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The department is prepared to offer advanced courses in the following branches of chemistry, particularly as applied to agriculture: —

(*a*) Inorganic chemistry.
(*b*) Organic chemistry.
(*c*) Physiological chemistry.
(*d*) Physical chemistry.
(*e*) Analytical chemistry.

Here follows a statement of courses which may be selected by any one properly qualified, and particularly by those who are desirous of doing work for advanced degrees: —

*Course A.* Research in industrial problems applied to agriculture.

Associate Professor PETERS.

*Course B.* Research in physico-agricultural chemistry. Prerequisite, Course 15 or its equivalent. Assistant Professor ANDERSON.

*Course C.* Advanced analytical chemistry. Research work in connection with the study of methods of analysis of fertilizers, cattle feeds, dairy products, soils, insecticides and sugars. Recent and original methods will be applied to a study of the composition of agricultural products. Professor WELLINGTON.

*Course D.* Advanced organic chemistry. Special topics in advanced organic chemistry will be considered, both by lectures and in the laboratory. These will include such subjects as constitution and properties of carbohydrates, proteins and fats, uric acid and related compounds, and alkaloids; also such purely chemical phenomena as isomerism, tautomerism and optical rotation. The reading will include "The Monographs on Biochemistry," Cohen, Schorlemmer and Lachman. Associate Professor CHAMBERLAIN.

*Course E.* Advanced topics in physiological agricultural chemistry will be studied especially in the laboratory, including digestion, metabolism and nutrition, dietetics, feeding rations, enzymatic action and isolation of enzymes. Required reading will be followed in Abderhalden, Lusk, Hammersten, Stiles, Armsby and Euhler. Associate Professor CHAMBERLAIN.

Students for the advanced degrees of master of science and doctor of philosophy will be given a special outline of work, and will also be assigned a subject for an original thesis by the professor in charge of the work, all of which must be completed to the satisfaction of the chemical staff and particularly of the professor under whom the work is done. Students not working for a degree may take special work along agricultural chemical lines. Information may be obtained by consulting the chemical staff.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogeny; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photographs of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best article on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology as a minor.

HORTICULTURE. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, and which are as follows: Pomology, Floriculture, Landscape Gardening, Forestry and Market Gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in General Horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

ZOÖLOGY. — Courses in zoölogy are available as a minor for the degree of master of science, and as a minor for the degree of doctor of philosophy. The nature of the work varies according to circumstances, and may be intensive in a special field, or of a somewhat more general character, depending on the student's previous acquaintance with general zoölogical science.

The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

# THE SHORT COURSES

AND

# THE EXTENSION SERVICE.

# THE SHORT COURSES AND THE EXTENSION SERVICE.

*The Short Courses and the Extension Service.*

Through its Extension Service, the Massachusetts Agricultural College attempts to make every department of the institution a contributing factor toward developing the agriculture and country life of the Commonwealth. The work of the Extension Service divides itself quite naturally into the Short Courses given at the college and the various activities of an educational nature which are carried on all over the State.

Under the usual definition of extension activities, Short Courses are not strictly extension projects. They are rather a part of the academic work of the institution. For the sake of administrative efficiency it has seemed best to place them in charge of the director of the Extension Service in so far as organization and direction are necessary. An effort is made through these courses to bring to the college, for a few days or a few weeks, as many people as can possibly be reached in this way. In the main, the instruction in the Short Courses is given by the regular teaching force of the college, the same laboratories and equipment being used for this work as in the regular college work.

The Extension Service proper comprises various methods for the dissemination of agricultural information to the people of the Commonwealth who are interested in agriculture and country life, but who cannot come to the college for even a short time. The object of the Extension Service is to make the college as useful to the people of the Commonwealth as possible.

## A. THE SHORT COURSES.

### ORGANIZATION AND DESCRIPTION.

The work is organized thus: —

Short Courses given at the College.
1. Winter School.
    - (*a*) Ten Weeks' Winter Course.
    - (*b*) Apple Packing School.
    - (*c*) Farmers' Week.
    - (*d*) Beekeepers' Course and Conference.
    - (*e*) Poultry Conference.
2. Summer School.
    - (*a*) The Summer School (General Course).
    - (*b*) Conference for Rural Community Leaders.

EXPENSES IN THE SHORT COURSES. — The expense of attending any of the Short Courses will be about as follows: —

| | |
|---|---|
| Registration fee, | $5 |
| Furnished rooms in private houses, | $1.50–$3 |
| Board at college dining hall, per week, | $4 |
| Board with private families, per week, | $5–$6 |

It is expected that a lunch counter will be operated in connection with the college dining hall. Meals may be obtained there *à la carte* at very reasonable prices.

Students in each of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES. — No entrance examinations are required, but students are advised to review their school work in English and arithmetic. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women.

Students must be at least eighteen years of age and must furnish satisfactory evidence of good moral character. References are required and these are investigated before applicants are accepted.

### *Winter School.*

COURSES IN THE TEN WEEKS' WINTER SCHOOL (JAN. 6 TO MARCH 14, 1913). — The following courses were given: —

1. Soil Fertility. Associate Professor HASKELL. Three periods a week for ten weeks.
2. Field Crops. Mr. E. M. MCDONALD. Three periods each week for ten weeks.
3. Breeds and Breeding. Associate Professor MCLEAN and Mr. QUAIFE. Three one-hour and two two-hour periods each week for ten weeks.
4. Feeding and Management. Associate Professor MCLEAN and Mr. QUAIFE. Two periods each week for ten weeks.
5. Dairying. Associate Professor LOCKWOOD, Mr. COONS and assistants. Three one-hour, two two-hour and two three-hour periods each week for ten weeks.
6. Dairy Bacteriology. Associate Professor LOCKWOOD. Two periods each week.
7. Animal Diseases and Stable Sanitation. Professor PAIGE. Two periods each week for ten weeks.
8. Poultry. Associate Professor GRAHAM. Five one-hour and two two-hour periods each week for ten weeks.
9. Fruit Growing. Professor SEARS. Four lectures and one laboratory period each week for ten weeks.
10. Market Gardening. Assistant Professor YEAW. Two periods each week for ten weeks.
11. Landscape Gardening. Mr. HARRISON. Two periods each week for ten weeks.
12. Floriculture. Professor WHITE. Five periods each week for ten weeks.
13. Forestry. Professor CLARK. One lecture a week for ten weeks.
14. Botany. Assistant Professor OSMUN and Mr. MCLAUGHLIN. Three periods each week.
15. Entomology. Professor FERNALD and assistants. Three periods each week for ten weeks.
16. New England Agriculture (required). Two periods a week for ten weeks.
17. Farm Buildings. Professor FOORD. One period a week for ten weeks.
18. Farm Accounts. Professor FOORD. Two periods each week for ten weeks.
19. Mechanics. Associate Professor LOCKWOOD and Mr. SCHROYER. Two periods each week for ten weeks.
20. Rural Sanitary Science. Assistant Professor GAGE. Two periods each week for ten weeks.
21. Beekeeping. Assistant Professor GATES. Two periods each week for ten weeks.
22. Rural Improvement. Professor WAUGH. One lecture each week for ten weeks.

APPLE PACKING SCHOOL. — The work of this school, which is conducted by the department of pomology, is of a practical nature and includes both box and barrel packing. Persons taking the course will become familiar with the various types of packs and will receive sufficient practice to enable them to do good commercial packing.

The work in packing is supplemented by lectures on phases of commerical orcharding, such as planting, varieties, spraying, pruning, harvesting and marketing.

A fee of $5 to help pay for fruit and other materials used is charged for this course.

FARMERS' WEEK. — In order to reach those who cannot come to the college for a longer time this very practical course, four days in length, is given each year. The regular college equipment is used and work of the regular faculty is supplemented by lectures and demonstrations given by eminent men.

The work is divided into four sections: (1) General agriculture, to include farm management, farm crops and so forth; (2) Dairying, animal breeding and feeding, poultry, veterinary science and bacteriology; (3) Horticulture, to include fruit growing, market gardening, floriculture and forestry; (4) Farmers' wives' section, including lectures and demonstrations in home economics, cooking and problems of homemaking.

Features of the week are the evening lectures by specialists along agricultural lines, the conference pertaining to problems of rural betterment aside from practical agricultural topics, a corn show, grain show, dairy show and so forth.

The Massachusetts Dairymen's Association and the Massachusetts Agricultural College Agricultural Improvement Association hold their annual meetings at the college during this week.

Complete programs of the 1914 Farmers' Week may be obtained in February, 1914.

BEEKEEPERS' COURSE. — In the last three years a complete apiary and equipment has been brought together at the college, under the direction and management of Dr. Burton N. Gates. This equipment furnishes the best of facilities for the teaching of beekeeping and allied subjects. A conference of beekeepers, with extensive exhibits of beekeepers' supplies and apparatus, is held annually at the close of each short course.

The courses offered in 1913 are: —

1. Practical Phases of Beekeeping. Associate Professor GATES.
2. Crops for Honey Bees. Dr. BROOKS.
3. Relation of Bees to the Pollination of Plants. Professor STONE.
4. Origin and Evolution of the Honey Bee. Professor FERNALD.
5. Bees and Beekeepers' Supplies. Professor PAIGE.

The features of the convention are lectures, demonstrations by authorities of national reputation, as well as exhibits of inventors, manufacturers, supply merchants and queen rearers. A special invitation is extended to all beekeepers to display and demonstrate inventions, implements or methods. If table space is desired or special equipment is to be prepared, notice should be sent to Dr. Burton N. Gates, Amherst, Mass., at least two or three weeks before the convention. The college provides covered tables for the exhibits.

POULTRY CONFERENCE. — In order to give a large number of poultrymen, who cannot come to the college for a longer time, practical instruction in modern methods of breeding, feeding, poultry-house construction, operation of incubators and brooders, selecting and judging poultry for utility and for show, marketing poultry products, and so forth, a convention lasting nearly a week is held each year. The regular date has been changed from the spring of the year to the summer, and the meeting will be held July 28–30, 1913.

### *The Summer School.*

The Summer School of Agriculture of the Massachusetts Agricultural College, which was omitted in 1912, reopens July 1, 1913, for a term of five weeks. This is the sixth session of the summer school, those of 1907 to 1911 having been highly successful. The experience of these five years will aid in making material improvements in the session of 1913.

The work of the summer school was designed originally for school teachers. The attendance has been largely of that class, and special attention will be given to the needs of teachers each year. It has been found, however, that there are many others who seek a general knowledge of theoretical and practical agriculture, and who can come to the college conveniently during the summer season. Extended courses are offered for the benefit of such persons also.

The following courses will probably be offered in 1913: —

Soils and tillage, field crops, domestic animals, dairying, poultry husbandry, fruit growing, practical gardening, trees and shrubs, forestry, landscape gardening, elementary chemistry, agricultural chemistry, plant life, cryptogamic botany, bird life, insect life, entomology, beekeeping, home economics, domestic science, home and school gardening, high school agriculture, home floriculture, agricultural economics, rural sociology, rural literature, agricultural education, organized play and recreation, arts and crafts.

From these courses it will be possible to make up programs of work suitable to the needs of almost every one, but especially of school teachers, principals, superintendents, school committeemen, farm owners, householders, suburban residents, clergymen, pastors, preachers, social workers and those who have a general interest in agriculture. Persons who are in doubt as to what courses will best suit their needs had better correspond with the Director of the Extension Service, who will gladly advise in all such matters.

Special courses covering two weeks are offered especially for clergymen, librarians and other rural leaders.

General Plan. — From the courses offered, each student may elect courses amounting to not less than ten nor more than fifteen exercises a week, unless a larger or smaller amount of work is permitted by the director. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises are arranged for one afternoon each week. These are on topics of interest to all. Class excursions are arranged for every Wednesday afternoon, and more extended excursions for the whole school are conducted every Saturday. These are personally conducted by members of the faculty.

Round tables and special discussions are arranged by various instructors as their courses require.

A course of evening lectures on popular topics relating to the work of the school are a feature of the general program. Several able lecturers are engaged each year for this course. No admission is charged for these lectures.

The expenses are low. Amherst is situated in one of the most noted historical and educational centers in this country. Any one interested in problems pertaining to country life should not fail to attend. A descriptive bulletin can be had March 1, 1913.

Conference of Rural Leaders. — The Annual Conference of Rural Leaders will be held July 30–August 2, as a closing feature of the summer school.

It is hoped the following organizations will co-operate as usual with the college by furnishing teachers and lecturers for their respective sections: the Federation of Churches of Massachusetts, the State Board of Education, the Free Public Library Commission, the Massachusetts Civic League, the State Board of Health, the County Work of the Young Men's Christian Association, the National Board of the Young Women's Christian Association, the New England Home Economics Association, the Russell Sage Foundation and the State Grange.

Definite class instruction will be given each morning. The afternoons will be given up entirely to special and general conferences, demonstrations of organized play, recreation and so forth. The evenings will be given over to music and lectures by the most eminent men who are making a study of rural sociology, economics and education.

The Rural Social Service exhibits will be more elaborate and extensive than in 1912.

The object of this conference is to acquaint those who are leaders in their respective communities with the work that is going on, not only in Massachusetts but in New England and other parts of the world, and to give them renewed inspiration and enthusiasm for larger and more intelligent efforts.

Teachers, clergymen, grange officers, librarians, county Y. M. C. A. workers, town officers, boards of health, officers of village improvement societies, homemakers, school officers, and all others interested in community development, are cordially invited to attend this conference. The expenses for board and room are low. There are no tuition or registration fees.

A complete program will be published in June, 1913, and can be had on application.

## B. THE EXTENSION SERVICE.

### Organization and Description.

1. Special Days for Foreigners, Agricultural Associations, etc.
2. Instruction given away from the College.
    (1) Correspondence Courses.
    (2) Lecture Courses and Demonstrations.
    (3) Conferences for Community Development.
    (4) Extension Schools of Agriculture.
    (5) Educational Trains (Steam and Trolley).
    (6) Educational Exhibits, with Lectures and Demonstrations at Fairs.
    (7) Demonstration Orchards.
    (8) Dairy Improvement Associations.
    (9) The Massachusetts Agricultural College Agricultural Improvement Association.

(10) Agricultural Surveys.
(11) Advisory Work with State Institutions, Individuals, etc.
(12) Publications, "Facts for Farmers," etc.
(13) Student Extension Work.
(14) Faunce Demonstration Farm.
(15) Boys' and Girls' Clubs.
(16) Demonstration Plots.
(17) Traveling Libraries.
(18) Co-operation with various organizations already in existence.
(19) District Field Agents.
(20) Information by Correspondence, etc.

### 1. *Special Days for Foreigners, Associations, etc.*

Days are set aside for special attention to the interests of foreigners, of agricultural organizations, etc.

Agricultural Organizations. — It has been especially pleasing to the college to have organizations such as the Massachusetts Poultry Association, the Massachusetts Fruit Growers' Association, Market Gardeners' and Breeders' associations, and others, meet frequently at the college. Usually a program of one or two days is provided, largely by the college faculty. These meetings serve the twofold purpose of giving the members of these organizations a chance to inspect the equipment and see the work that is being carried on by the college, and it also gives the college men a chance to find out the needs of the men engaged in the various lines of agriculture. It is hoped that other organizations besides those mentioned above will also meet at the college and that meeting will be even more frequent than in the past.

Polish Farmers' Day. — In order to show the Polish farmer — who forms a large part of the population of this section of the Connecticut valley — what the college has to offer him, a Polish Farmers' Day is held each year with much success. Members of the faculty give lectures which are interpreted by Mr. K. J. Wolski of Holyoke; some of the Polish farmers who have made a success of farming also give talks. The Immigration Department of the State, the Y. M. C. A. and the Polish American Alliance co-operate with the college in this work.

### 2. *Instruction given away from the College.*

An abstract follows of the instruction that is given away from the college. The abstract divides this instruction into correspondence courses and instruction not included in the correspondence course.

Correspondence Courses. — The correspondence courses are offered by the college in response to calls from all sections of the State from people who desire agricultural information, but who cannot come to the college for it. The courses are designed to meet the needs of farmers, dairymen, stock breeders, fruit growers, market gardeners, floriculturists and teachers in elementary schools, high schools, academies or normal schools.

Since agricultural science and practice are changing so rapidly, it is the purpose to give a summary of the latest information on the subjects treated, yet in such language that any who pursue the study can readily understand the work. Additional courses, covering other subjects, will be added from year to year.

*Method of Conducting Correspondence Work.* — While a large number of books have been written on various agricultural subjects, very few of them are especially adapted to the correspondence course work. For this reason our courses are conducted principally by specially prepared lessons. The subject-matter partakes somewhat of the lectures that are given to the college classes. Whenever possible we recommend one or two books which ought to be purchased and read along with the course. Other books are recommended for collateral reading, which oftentimes can be obtained from the local libraries.

The courses are especially recommended to the Y. M. C. A. and to granges and other farmers' clubs for study. It is to be hoped that grange lecturers, club secretaries, and other interested persons, will organize study classes. If the size of the class, or the interest which the members take in the subject, is sufficient, we shall be pleased to send a representative of the college to the class from time to time to discuss the work and offer suggestions. A description of the correspondence courses follows: —

1. Soil and Soil Improvement. Director HURD.
2. Manures and Fertilizers. Director HURD.
3. Field Crops. Associate Professor HASKELL.
4. Farm Dairying. Associate Professor LOCKWOOD.
5. Fruit Growing. Professor SEARS and Mr. REES.
6. Market Gardening. Assistant Professor YEAW.
7. Animal Feeding. Mr. STORY.
8. Floriculture. Professor WHITE. Part I. The general culture of plants, including those grown out of doors as well as those grown under glass. Part II. Greenhouse construction and heating. Part III. Carnation culture. Part IV. Rose culture. The cost of each part, not including the text-book, is $1.
9. Farm Accounts. Professor FOORD.
10. Entomology. Professor FERNALD.
11. Agricultural Education. Professor HART.
12. Beekeeping. Assistant Professor GATES.
13. Forestry. Professor CLARK.
14. Shade Tree Management. Professor STONE.
15. Agriculture in the Elementary Schools. Associate Professor MORTON.
16. Community Co-operation in Elementary Education. Associate Professor MORTON.
17. Poultry Husbandry. Associate Professor GRAHAM. (Will be ready February, 1913.)

*Enrollment for Correspondence Courses.* — Students may enroll in the courses any time between September 1 and June 1 of the following year. It has been found advisable not to continue the courses through the summer because the farmers as well as the other students are so busy that they cannot spend the necessary amount of time upon the lessons during the summer months. We are better equipped than we were last year to handle the great number of students who desire these courses, and we hope to be able to take care of all the students who enroll. An early enrollment is advised, however.

Enrollment must be made on the card which is furnished by the college. This will entitle the student to a suitable set of covers and other privileges.

*Expenses of the Correspondence Courses.* — In order that none may enroll but those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at the uniform rate of $1 for each course, except in Course 8, where it is necessary to charge $1 for each of the four parts, as each part is really a course in itself. This fee is payable strictly in advance when the enrollment card is sent, and the first lesson of the course will not be sent until the fee is received.

This fee is not charged to cover cost of preparing the course, for this, in time of the instructors, is many times what is received, but it is used to defray the expenses of postage and materials which are used in preparation of the lessons, and to insure a higher quality of work from those who enroll.

The cost of the text-book, when one is used, is in addition to the enrollment fee. We strongly urge all students to purchase one or two books to be used in connection with each course, because they can be kept and used for reference purposes after the course is completed. We have made arrangements with the Johnson Book Company, Amherst, Mass., to handle all of these books at reduced rates. For a catalogue of books and prices, address the Johnson Book Company. Remittances should be made by money order or check.

LECTURE AND DEMONSTRATION COURSES AWAY FROM THE COLLEGE. — The renewed and unprecedented interest in agriculture and rural life makes many more calls on the college for lectures and demonstrations than can be met. These calls come from all sorts of organizations, and the audiences are usually of good size and composed of interested people, who are eager to get the latest scientific information to use in their work. A list of lectures and their subjects can be obtained upon request.

EXTENSION SCHOOLS OF AGRICULTURE. — The extension schools held by the college during the past year were most successful, and many applications are being received for schools during 1912–13. An effort is being made so to locate these schools that they may best serve the people of the whole State. Valuable features are being added, and the work will be kept up to the highest possible standard.

EDUCATIONAL EXHIBITS, LECTURES AND DEMONSTRATIONS AT FAIRS. — During the past year lectures and demonstrations were given at sixteen fairs throughout the State. It is expected that during the next year a new college exhibit will be prepared which may be loaned to the fairs and other organizations which ask for an exhibit each year. Aside from the lectures and demonstrations which were given, successful stock judging contests were held under the direction of the college at 13 fairs.

DEMONSTRATION ORCHARDS. — During 1912, 2 new orchards have been planted and 1 orchard renovated, making a total of 10 new orchards and 4 renovated orchards now under the direction of the college. Three new orchards have been promised for the spring of 1913.

DAIRY IMPROVEMENT ASSOCIATIONS. — At the present time three associations have been organized. Others will be started as competent official testers can be found.

THE MASSACHUSETTS AGRICULTURAL COLLEGE AGRICULTURAL IMPROVEMENT ASSOCIATION. — This is an organization largely of graduates and ex-students of the college, banded together for the purpose of agricultural betterment in Massachusetts. There are at the present time about 136 members, 30 of whom are taking active part in the producing of high-class seed corn and seed potatoes, and in demonstrating the possible improvement of worn out pastures.

The usefulness of this association in the State will depend almost wholly upon the energy with which the members enter into the plans worked out by the executive committee of the association. That great things are possible for the association is shown by the work done by similar associations in other States.

AGRICULTURAL SURVEYS. — Through these surveys an attempt is made, by systematic study, to find out the exact conditions of farm management, including dairying, orcharding, poultry raising and other specialties, the income which is derived from these, and the facilities for marketing products. An inquiry into the social, educational, religious and moral life of rural communities is also made.

ADVISORY WORK WITH STATE INSTITUTIONS, INDIVIDUALS, ETC. — For the past two years special effort has been made to comply with the requests of State organizations and individuals for advice. Visits have been made when possible, but it is impossible to comply with half of the requests which come in each year.

EXTENSION SERVICE PUBLICATIONS. — Each year bulletins and circulars descriptive of the various short courses are published. A monthly pamphlet, "Facts for Farmers," is also issued. It is the aim of this pamphlet to give timely information on agricultural subjects in a brief and simple manner. Articles on spraying, pruning, poultry, clean milk and so forth have been issued and are in great demand. Bulletins and "Facts for Farmers" will be sent to all who apply for them.

STUDENT EXTENSION WORK. — As would be expected in an institution which stands for agricultural improvement in its broadest sense, the students of the Massachusetts Agricultural College are eager to have a hand in the general work of community betterment carried on by the college staff. A large number of students are employed each year in the teaching of English to foreigners in towns located near Amherst, and in carrying on helpful meetings of a general nature throughout the western part of the State. Calls for this kind of work are many, and the willingness on the part of the students is increasing from year to year. Under efficient management this work promises to be very successful in every detail.

THE FAUNCE DEMONSTRATION FARM. — This farm, located at Sandwich, is under the direction of a committee from the college faculty, of which the Director of the Extension Service is chairman. The farm has demonstrated beyond a doubt that small fruits, vegetables and poultry can be raised at a profit on Cape Cod. Through the work of this farm the whole community has taken on new life. The superintendent of the farm, Mr. A. W. Doolittle, has taught agriculture in the schools of the village and has given much help to the farmers of Barnstable County by his personal visits to farms.

DEPARTMENT OF AGRICULTURAL EDUCATION. — The extension work of this department is devoted to the promotion of agriculture and practical arts relating to country life in the public schools of the State. This is done by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children and giving lectures before granges, farmers' clubs, and other organizations interested in this line of endeavor. The work of the agricultural clubs is under the local management of the superintendent of schools or of some one suggested by him. Each town is expected to hold an exhibit of products. Exhibits covering rather extensive districts are incorporated with the various agricultural fairs in the State. In this way the promotion of elementary instruction in agriculture is carried on by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College.

The college aspect of the work is under the immediate direction of Associate Prof. O. A. Morton. His entire time is devoted to it. His services are at the disposal of the schools and school patrons in helping to promote the teaching of agriculture.

DEMONSTRATION FIELD PLOTS. — Aside from the work done by the Massachusetts Agricultural College Agricultural Improvement Association, little has been done toward placing demonstration plots in different sections of the State. This work is to be developed during the coming year, however.

LIBRARY EXTENSION WORK. — The college library has charge of this part of the Extension Service, which has to do with the circulation of agricultural literature throughout the State. This line of endeavor was instituted in 1910 by the sending out of four collections of books on agriculture and related subjects. The demand for these traveling libraries has been such that the work has grown to splendid proportions, there being now on hand a collection maintained, separate from the regular college library equipment, of nearly 600 books and pamphlets especially for this purpose. This book material is loaned out to the public libraries of the State upon request, and for such periods of time as may be regulated by supply and demand. Collections vary in size and character according to the nature of the need of the locality. From January to October, 1912, a total of 629 volumes were loaned to 37 libraries.

CO-OPERATION WITH EXISTING ORGANIZATIONS. — The aim of those in charge of the Extension Service has been, from the start, to co-operate with existing organizations so far as possible. During the past three years it has co-operated with the State Board of Agriculture, the State Board of Health, the State Dairy Bureau, the State Grange, the Boston Chamber of Commerce, the Springfield Board of Trade, the work of several of the various village improvement associations, the Tent Evangelistic Work in western Massachusetts, Federation of Churches of Massachusetts, State Board of Education, Free Public Library Commission, Massachusetts Civic League, State Board of Health, county work of Y. M. C. A., New England Home Economics Association, the Russell Sage Foundation, the Board of Home Missions, besides men's clubs in churches, women's clubs, schools and other agencies.

CO-OPERATION WITH THE UNITED STATES DEPARTMENT OF AGRICULTURE. — Through the co-operation of the United States department it has been possible to place in Massachusetts a field agent whose duty it is to visit farms and consult with the owners, aiding them in questions of farm management, and to conduct farm management investigations.

DISTRICT FIELD AGENTS. — It is hoped that the college will soon be able to have in each county of the State a field agent whose duty it will be to visit farmers in the county, bringing to them the best advice the experts at the college can give.

During the coming year Mr. A. W. Doolittle, superintendent of the Faunce Demonstration farm, Sandwich, will serve the college on part time as field agent for Barnstable County.

INFORMATION BY CORRESPONDENCE. — Besides these things already mentioned thousands of helpful circulars and bulletins are printed and distributed, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who ask for them, and correspondence from any who desire such help as has been mentioned is gladly received. Address all communications to the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

### STATISTICS OF THE EXTENSION SERVICE FOR 1912.

| | | People reached during 1912. |
|---|---|---|
| *Enrollment in Short Courses.* | | |
| Ten Weeks' Winter Course, | 131 | |
| Poultry Course, | 80 | |
| Apple Packing School, | 40 | |
| Farmers' Week, | 1,040 | |
| Beekeepers' Course, | 10 | |
| Polish Farmers' Day, | 57 | |
| Conference for Rural Community Leaders, | 184 | |
| | | 1,482 |
| *Correspondence Courses.* | | |
| Present enrollment, | 578 | |
| Courses completed and work dropped during year, | 175 | |
| | | 753 |
| *Lectures.* | | |
| Number given, | 591 | |
| Approximate attendance, | 27,469 | 27,469 |
| *Boys' and Girls' Clubs.* | | |
| Number of clubs, | 127 | |
| Number of members, | 13,462 | 13,462 |
| *Massachusetts Agricultural College Agricultural Improvement Association.* | | |
| Members enrolled, | 137 | 137 |
| *Dairy Improvement Associations.* | | |
| Members enrolled, | 55 | 55 |
| *Extension Schools.* | | |
| Total membership in five schools, | 500 | 500 |
| *Student Extension Work.* | | |
| Attendance each week at four evening schools, | 80 | 80 |
| *Mailing List.* | | |
| Facts for Farmers, | 1,553 | |
| Short Courses, | 3,764 | |
| | | 5,317 |
| Total, | | 49,366 |

# GENERAL INFORMATION.

# GENERAL INFORMATION.

## A. FINANCIAL AND ADMINISTRATIVE.

### STUDENT EXPENSES.

TUITION. — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $40 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts.

DORMITORIES AND BOARD. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suits of three, — one study room and two bed rooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1.25 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present the price of board there is about $4 a week. Board is furnished at cost, the price being determined by adding 5 per cent. to the audited rate for the previous three months, and at the end of the period final settlement is made on the basis of actual cost.

### EXPENSES.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts free; other citizens of the United States, $40 a year; foreigners, $120 a year.

| | Low. | High. |
|---|---|---|
| Room in college dormitories or in private houses, | $39 00 | $110 00 |
| Board in college dining hall, $4 a week, | 144 00 | 144 00 |
| Laundry, 50 cents to 85 cents a week, | 18 00 | 30 00 |
| Military uniform, first year, | 13 50 | 13 50 |
| Laboratory fees, | 2 00 | 20 00 |
| Books, stationery and other miscellaneous, | 23 50 | 32 50 |
| | $240 00 | $350 00 |

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student furniture in dormitories either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $250 and $350 per year.

### *Initial Charges.*

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

| | Freshmen. | Sophomores. | Juniors and Seniors. |
|---|---|---|---|
| Board (if at college dining hall) four weeks in advance, | $16 00 | $16 00 | $16 00 |
| Subscription to "Signal" (college paper),[1] | 1 50 | 1 50 | 1 50 |
| Assessment for support of Social Union, | 1 50 | 1 50 | 1 50 |
| Laboratory fees: — | | | |
| Chemistry, | 5 00 | – | – |
| Zoölogy, | – | 2 00 | – |
| For elective subjects, | – | – | 1 00–10 00 |
| Military uniform, | 13 35 | – | – |
| Room rent (if in college dormitory), | – | – | 19 50–33 00 |
| Student tax for support of athletics,[1] | 8 00 | 8 00 | 8 00 |
| | $45 35 | $29 00 | $47 50–$70 00 |

[1] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Signal" is fixed by the managers; the amount of athletic tax by vote of the student body.

### *Laboratory Fees.*

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage.

The fees as indicated below will become effective in September, 1913.

| Agronomy: — | Per Semester. |
|---|---|
| Course 3, | $1 50 |
| Course 4, | 0 50 |
| Course 5, | 1 00 |
| Course 6, | 1 00 |

| | Per Semester. |
|---|---|
| Animal husbandry: — | |
| Courses 2 and 4, each, | $1 00 |
| Course 7, | 2 00 |
| Botany: — | |
| Graduates, | 4 00 |
| Courses 2 and 3, | 3 00 |
| Course 4, | 2 00 |
| Course 5, | 1 00 |
| Courses 7, 9, 11, 13, | 3 00 |
| Chemistry: — | |
| Courses 1, 2, 7. 8, 13, 15, | 3 00 |
| Courses 3, 4, 5, 6, | 4 00 |
| Courses 9, 10, 11, 12, 14, 16, | 5 00 |
| Course 18, | No fee. |
| Entomology: — | |
| Graduates, | 3 00 |
| Entomology 3 and 4 each, | 3 00 |
| Landscape gardening: — | |
| Landscape gardening 1, | 2 50 |
| Landscape gardening 2, | 2 50 |
| Landscape gardening 3, | 3 00 |
| Landscape gardening 4, | 3 00 |
| Landscape gardening 6, | 1 00 |
| Landscape gardening 7, | 3 00 |
| Landscape gardening 8, | 3 00 |
| Drawing 1 and 2 each, | 2 50 |
| Pomology: — | |
| Pomology 3 and 4 each, | 5 00 |
| Poultry husbandry: — | |
| Course 3, | 1 50 |
| Course 4, | 2 00 |
| Zoölogy: — | |
| Elementary 1, | 2 00 |
| Invertebrate 3, | 4 00 |
| Vertebrate, | 4 00 |

## STUDENT AID.

SELF HELP. — A number of students find opportunities for earning money without depending upon the college to furnish them with work, and many are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for employment, no one man can receive a large amount of work through the college.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and thirty or more students are employed at the dining hall. Applications for student labor should be made directly to the president. Applicants are required to present a certificate, signed by parent or guardian and by one of the selectmen or aldermen of the town or city in which they reside, showing that the applicant needs the assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last year or two the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

## STUDENT ACCOUNTS.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each semester. This rule is strictly adhered to, and no student will be allowed to register in his class until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each semester at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the semester he is more than one week in arrears in his payment for board.

All money due for student labor shall be applied on account toward any bills that a student may owe to the institution.

## STUDENT RELATIONS.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

## B. COLLEGE ACTIVITIES.

### GENERAL EXERCISES.

Chapel exercises are as a rule held four mornings each week. On Wednesday, instead of chapel an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

### STUDENT ACTIVITIES.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about four years ago. All students become members of the Union by paying a small fee. The Union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study. In the basement of this building there is also a game room for pool and billiards. In the fall and winter months the Union gives a series of entertainments, free to the students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of under-graduate conduct, and represents before the faculty the interests of the student body.

The M. A. C. Christian Association is active both socially and religiously. Under its direction voluntary Bible classes are conducted during the winter months. A Catholic Club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A Dramatic Club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and tennis.

A Rifle Club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Signal," published weekly by the student body, and the "Index," published annually by the members of the junior class. As a part of the work in journalism, students supply The Bay State Ruralist, a special page in the "Springfield Union."

The Stockbridge Club is an organization of students especially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Scientific clubs also exist in the departments of French, entomology and landscape gardening.

## C. ACADEMIC AND DEPARTMENTAL.

### Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study, and present a satisfactory thesis, will be granted the degree of doctor of philisophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

### Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1912 are: —

Agriculture. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

Animal Husbandry. — The F. Lothrup Ames' Prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live-stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

BOTANY. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1913, a prize of $5 is offered to that member of the sophomore class who presents the best herbarium of native flowering plants.

GENERAL IMPROVEMENT. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example.

PUBLIC SPEAKING. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declarations in the Burnham contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students. Interclass debates, with prizes, are also held annually.

## MILITARY DIPLOMAS.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the department of military science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

## EQUIPMENT.

AGRONOMY. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a surveyor's transit, a wye level, drainage levels, rods, steel tapes, surveyor's pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

ANIMAL HUSBANDRY. — The most important part of the equipment for laboratory work in animal husbandry is the new judging pavilion, which will be completed by Jan. 1, 1911. This will give new opportunities for practice work in management of live stock, together with demonstrations in judging. Another very essential part of the equipment for this department is the live stock of the college farm, which includes pure bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach and Percheron horses, and Berkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

BOTANY. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 90 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

CHEMISTRY. — The chemical department of the college now occupies the entire building previously known as the "old chapel." The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to qualitative and quantitative analysis and organic and physiological chemistry. The second floor is occupied by the general lecture room, by offices for the several members of the staff, by laboratories for physical chemistry and for beginners in quantitative analysis. The third floor has recently been fitted for work in general chemistry, and has desk room and hoods sufficient to accommodate 66 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 100 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, food, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — GENERAL ENTOMOLOGICAL LABORATORIES. — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomogical and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped. It will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room, provided with chemical desks and apparatus, methods for the determination of the impurities and adulterations of insecticides are taught. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Entomology. — Beekeeping. — For this work the main office, museum and lecture rooms are in the entomological building. There is also an apiary covering approximately two acres which will consist of about fifty colonies of bees in various types of hives and maintained for the several practical and experimental purposes. The apiary also includes a collection of nectar-yielding plants representative of the native flora as well as of the more important nectar sources from other localities. Especial opportunity is therefore given for a study of this fundamental problem of forage. Upon the apiary site is an eight-room building (the first in the world erected exclusively for teaching beekeeping) modeled to meet both the requirements of teaching and of a practical apiary. This building contains a boiler room, capacious wintering cellar, wax extraction room, general carpenter and work shop, laboratory, office, honey extraction room and stock room. The beekeeping equipment also includes an unexcelled collection of apicultural implements, natural history specimens and other curiosities. Practically every device used in American apiculture is available, it being the aim of the department to procure new inventions and implements as fast as they appear for the purpose of study and comparison. Available to the students is a private library of apicultural literature consisting of upwards of 700 volumes and papers, possibly the most complete collection in the country. This entire equipment is acknowledged unique in model and in completeness for the United States and for the world.

Farm Administration. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

Floriculture. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

FORESTRY. — The department of forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distance of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects.

GEOLOGY. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes.

The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massachusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library — stack room, reading room and office — occupies the entire lower floor of the library-chapel building. It contains nearly 34,000 volumes and a large number of pamphlets, hitherto inaccessible, but which are being put into good working order as fast as possible. Works of a scientific character predominate, but economics, literature and history are well represented and are receiving due attention. The reading room provides a variety of periodical literature, both technical and popular, encyclopedias and general reference books, and a select collection of works for general reading.

The library is now being reclassified and recatalogued, to make the splendid collection of material here gathered together readily accessible and of the greatest working value. Every effort is being made toward developing the library into a vital intellectual center of college life, of equal value to every student, teacher and teaching department. In consequence, only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced.

Lectures are given to regular short course students to enable them to make the best use of the library. Emphasis is laid upon the proper use of the card catalogue, periodical indexes, bibliographies and guides; also, in general, assigned and class-room work, and essay and debate work.

The library hours are from 7.45 A.M. to 9 P.M. every week day, and from 9 A.M. to 2 P.M. on Sundays, in term time. Shorter hours prevail during vacations.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Military Science. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

Physical Education. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a bathroom. The gymnasium is open from 9 A.M. to 10 P.M., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Pomology. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1909–10, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrus fruit from Florida and Texas.

POULTRY HUSBANDRY. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 32 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; the 6 old experiment station buildings, each 12 by 18 feet, to be used as breeding houses, and 11 colony brooder houses. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry, carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chicken, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

PUBLIC SPEAKING. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests furnish a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Inter-college contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. On the second floor is a laboratory, 20 by 32 feet, for advanced work. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the departments of entomology and zoölogy-geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 one large wall case and 2 floor cases with space for 10 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 6 P.M. The curator is Associate Professor Gordon.

## Prizes and Awards, 1912.

Grinnell Prizes. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, $25, to Benjamin Gilbert Southwick.

Second prize, $15, to Francis Spink Madison.

Third prize, $10, to Eric Nichols Boland.

Botanical Prizes. — The Hills prizes, given by Henry F. Hills of Amherst, were awarded to members of the senior class as follows: —

*A.* — For the best herbarium, $15, to Ray Ethan Torrey.

*B.* — For the best collection of Massachusetts trees and shrubs, $10, to Ray Ethan Torrey.

*C.* — For the best collection of Massachusetts woods, $10, to Ray Ethan Torrey.

Special sophomore prize for the best herbarium, $5, to Ernest Elwood Stanford.

Honorary mention made of Raymond Edward Nute.

General Improvement. — The Western Alumni Association prize, given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character and example, was awarded as follows: —

Twenty-five dollars to Roland Alfred Payne.

Public Speaking. — The Burnham prizes, given to the students delivering the best and second best declarations, were awarded as follows: —

First prize, $15, to Leroy Everett Haskins.

Second prize, $10, to Isaac Barney Simon.

The Flint prizes, given to the students delivering the best and second best orations, were awarded as follows: —

First prize, a gold medal and $20, to Dau Yang Lin.

Second prize, a gold medal and $15, to Woon Young Chum.

Debating. — The prizes in the annual debate were awarded as follows: —

Fifteen dollars and a gold medal, to Theodore Joseph Moreau.

Fifteen dollars and a gold medal, to Benjamin Franklin Hubert.

Fifteen dollars and a gold medal, to Thomas Hemenway.

The prizes in the interclass debate were awarded as follows: —

To the team representing the Class of 1912, consisting of Theodore Joseph Moreau, Benjamin Franklin Hubert, Thomas Hemenway.

Each member of the above team was awarded a silver cup.

Military Honors. — The following-named cadet officers have been reported to the Adjutant-General of the United States army and to the Adjutant-General of the Commonwealth of Massachusetts, being efficient in military science and tactics and graduating therein with highest honors: —

Cadet Col. Marshall Cotting Pratt.
Cadet Maj. Eric Nichols Boland.
Cadet Capt. Benjamin Gilbert Southwick.
Cadet Capt. Francis Spink Madison.
Cadet Capt. Thomas Hemenway.

## SECRETARIES OF ALUMNI ASSOCIATIONS AND CLASSES.

Alumni Secretaries' Association of the Massachusetts Agricultural College.
*Secretary*: Ralph J. Watts, 1907, Amherst, Mass.

Association Alumni of the Massachusetts Agricultural College.
*Secretary*: Sidney B. Haskell, 1904, Amherst, Mass.

Local Alumni Association of the Massachusetts Agricultural College.
*Secretary*: Sidney B. Haskell, 1904, Amherst, Mass.

Alumni Club of Massachusetts.
*Clerk*: H. Linwood White, 1909, 136 State House, Boston, Mass.

Connecticut Valley Association of the Massachusetts Agricultural College.
*Secretary*: Charles L. Brown, 1894, 870 State Street, Springfield, Mass.

Massachusetts Agricultural College Club of New York.
*Secretary*: John Ashburton Cutter, 1882, 262 West 77th Street, New York, N. Y.

Massachusetts Agricultural College Club of Washington, D. C.
*Secretary*: Clarence H. Griffin, 1904, 1864 Park Road, Washington, D. C.

Western Alumni Association of the Massachusetts Agricultural College.
*Secretary*: Charles A. Tirrell, 1906, 4012 Perry Street, Chicago, Ill.

Massachusetts Agricultural College Pacific Coast Alumni Association.
*Secretary*: Thomas F. Hunt, 1905, Berkeley, Cal.

## *Class Secretaries.*

| Class of | Secretary. | Secretary's Address. |
|---|---|---|
| 1871 | E. E. Thompson, | 5 Jacques Avenue, Worcester, Mass. |
| 1872 | F. E. Kimball, | 8 John Street, Worcester, Mass. |
| 1873 | C. Wellington, | Amherst, Mass. |
| 1874 | D. G. Hitchcock, | Warren, Mass. |
| 1875 | M. Bunker, | Newton, Mass. |
| 1876 | C. Fred Deuel, | Amherst, Mass. |
| 1877 | Atherton Clark, | Newton, Mass. |
| 1878 | C. O. Lovell, | 5 Bromfield Street, Boston, Mass. |
| 1879 | R. W. Swan, | 41 Pleasant Street, Worcester, Mass. |
| 1880 | Alvan Fowler, | 413 Post Office Building, Philadelphia, Pa. |
| 1881 | J. L. Hills, | 59 North Prospect Street, Burlington, Vt. |
| 1882 | G. D. Howe, | 25 Winter Street, Bangor, Me. |
| 1883 | J. B. Lindsey, | Amherst, Mass. |
| 1884 | – – | – – |
| 1885 | E. W. Allen, | 1923 Biltmore Street, Washington, D. C. |
| 1886 | Dr. Winfield Ayres, | 616 Madison Avenue, New York City. |
| 1887 | F. H. Fowler, | Shirley, Mass. |
| 1888 | H. C. Bliss, | 14 Mechanic Street, Attleborough, Mass. |
| 1889 | C. S. Crocker, | 1003 South 25th Street, Philadelphia, Pa. |
| 1890 | David Barry, | 398 Walnut Street, Newtonville, Mass. |
| 1891 | H. T. Shores, | 177 Elm Street, Northampton, Mass. |
| 1892 | H. M. Thomson, | Amherst, Mass. |
| 1893 | F. A. Smith, | Turner Hill, Ipswich, Mass. |
| 1894 | S. F. Howard, | Amherst, Mass. |
| 1895 | E. A. White, | Amherst, Mass. |
| 1896 | A. S. Kinney, | South Hadley, Mass. |
| 1897 | C. A. Peters, | Amherst, Mass. |
| 1898 | – – | – – |
| 1899 | D. A. Beaman, | Rio Piedras, Porto Rico. |
| 1900 | E. K. Atkins, | 15 Hubbard Avenue, Northampton, Mass. |
| 1901 | J. H. Chickering, | Dover, Mass. |
| 1902 | H. L. Knight, | 1420 Buchanan Street, Washington, D. C. |
| 1903 | G. D. Jones, | North Amherst, Mass. |
| 1904 | P. F. Staples, | North Grafton, Mass. |
| 1905 | A. D. Taylor, | 1101 Tremont Building, Boston, Mass. |
| 1906 | Richard Wellington, | Geneva, N. Y. |
| 1907 | Clinton King, | 6 Beacon Street, Boston, Mass. |
| 1908 | J. A. Hyslop, | 860 North Mulberry Street, Hagerstown, Md. |
| 1909 | O. B. Briggs, | 1015 Fidelity Building, Baltimore, Md. |
| 1910 | F. L. Thomas, | Amherst, Mass. |
| 1911 | L. M. Johnson, | Newtown, Conn. |
| 1912 | F. S. Madison. | East Greenwich, R. I. |

# DEGREES CONFERRED AND ROLL OF STUDENTS.

# DEGREES CONFERRED — 1912.

## DOCTOR OF PHILOSOPHY.

Bartlett, Oscar Christopher, Westhampton. Massachusetts Agricultural College, B.Sc., 1909.

## MASTER OF SCIENCE.

McLaine, Leonard Septimus, New York, N. Y. Massachusetts Agricultural College, B.Sc., 1910.

## BACHELOR OF SCIENCE (B.Sc.).

| | |
|---|---|
| Ackerman, Arthur John, | Worcester. |
| Baker, Horace Mitchell, | Selbyville, Del. |
| Beals, Carlos Loring, | Sunderland. |
| Beers, Rowland Trowbridge, | Billerica. |
| Bent, William Richard, | Marlborough. |
| Bodfish, Edward Hill, | West Barnstable. |
| Boland, Eric Nichols, | South Boston. |
| Brett, Alden Chase, | North Abington. |
| Brown, Merle Raymond, | Greenwich Village. |
| Burnham, Arthur James, | Holyoke. |
| Burr, Frederick Huntington, | Worthington. |
| Carpenter, Jesse, Jr., | Attleborough. |
| Castle, Fred Arlo, | Roseburg, Ore. |
| Clapp, Raymond Kingsley, | Westhampton. |
| Curran, Daniel Joseph, | Marlborough. |
| Deming, Winfred Griswold, | Wethersfield, Conn. |
| Dodge, Albert Wesley, | South Hamilton. |
| Fagerstrom, Leon Emanuel, | Worcester. |
| Fisherdick, Warren Francis, | Amherst. |
| Fitts, Frank Orus, | North Amherst. |
| Fitzgerald, John Joseph, | Holyoke. |
| Fowler, George Scott, | Wayland. |
| Gallagher, James Andrew, | North Wilmington. |
| Gaskill, Lewis Warren, | Hopedale. |
| Gelinas, Louis Edmond, | North Adams. |
| Gibbs, Robert Morey, | Chester. |
| Gibson, Lester Earl, | Melrose. |
| Gray, Frank Leonard, | East Boston. |
| Hall, Henry Bass, | Northampton. |
| Hall, Horace Whitney, | Newton Centre. |
| Hallowell, Royal Norton, | Jamaica Plain. |
| Hamblin, Stephen Francis, | Marstons Mills. |
| Harlow, Joseph Alvin, | Turners Falls. |
| Heald, Jay Morrill, | Watertown. |
| Hemenway, Thomas, | Nashua, N. H. |
| Hickey, Francis Benedict, | Brockton. |
| Hills, Frank Burrows, | Bernardston. |
| Holland, Henry Lucius, | Amherst. |
| Hubert, Benjamin Franklin, | White Plains, Ga. |
| Kingsbury, Arthur French, | Medfield. |
| Lamson, Robert Ward, | Amherst. |
| Lin, Dau Yang, | Shanghai, China. |
| Lodge, Charles Albert, | Manchester. |
| Madison, Francis Spink, | East Greenwich, R. I |

| | |
|---|---|
| Martin, James Francis, | Amherst. |
| McGarr, Thomas Anthony, | Worcester. |
| Merkle, George Edward, | Amherst. |
| Merrill, Fred Sawyer, | Danvers. |
| Moreau, Theodore Joseph, | Turners Falls. |
| Mueller, Alfred Frederick, | Jamaica Plain. |
| Noyes, Harry Alfred, | Marlborough. |
| O'Flynn, George Bernhard, | Worcester. |
| Parker, Ralph Robinson, | Malden. |
| Pearson, Charles Cornish, | Arlington. |
| Peckham, Curtis, | New Bedford. |
| Philbrick, William Edwin, | Taunton. |
| Pierpont, John Edwards, | Williamsburg. |
| Pratt, Marshall Cotting, | Holderness, N. H. |
| Puffer, Stephen Perry, | North Amherst. |
| Raymond, Arthur Nathaniel, | Leominster. |
| Reed, Robert Edward, | Abington. |
| Robinson, Earle Johnson, | Hingham. |
| Rockwood, Lawrence Peck, | Waterbury, Conn. |
| Sanctuary, William Crocker, | Amherst. |
| Sellew, Lewis Raymond, | Natick. |
| Shaw, Ezra Ingram, | Amherst. |
| Southwick, Benjamin Gilbert, | Buckland. |
| Stack, Herbert James, | Conway. |
| Terry, Leon, | Springfield. |
| Torrey, Ray Ethan, | North Leverett. |
| Tower, Daniel Gordon, | Roxbury. |
| Tupper, George Wilbur, | Roxbury. |
| Turner, Howard Archibald, | Dorchester. |
| Wales, Robert Webster, | North Abington. |
| Warner, Roger Andrew, | Sunderland. |
| Weaver, William Jack, | Alandar. |
| Whitney, Charles Everett, | Wakefield. |
| Wilbur, Emory Sherman, | East Wareham. |
| Wilde, Earle Irving, | Taunton. |
| Williams, Edward Roger, | Concord. |
| Williams, Silas, | Fall River. |
| Wood, Howard Holmes, | Shelburne Falls. |
| Young, Edwin Burnham, | Dorchester. |

# ROLL OF STUDENTS.

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## SENIOR CLASS.

| | | |
|---|---|---|
| Adams, Winford Frederick,[1] | East Leverett, | Theta Chi House. |
| Allen, Harry Willis, | West Pelham, | West Pelham. |
| Anderson, Oscar Gustaf, | East Pepperell, | Entomological Building. |
| Angier, Harris William, | Westborough, | South College Tower. |
| Baird, Harry Albert,[1] | Somerville, | 4 South College. |
| Baker, Dean Foster, | Fairhaven, | 15 North College. |
| Barber, George Ware,[1] | Hyde Park, | 13 North College. |
| Bevan, Laurence Algur,[1] | Newtonville, | 15 North College. |
| Birdsall, Webster Jennings,[1] | Otego, N.Y., | Kappa Sigma House. |
| Borden, Ralph James, | Fall River, | 7 North College. |
| Brewer, Charlesworth Herbert, | Mt. Vernon, N.Y., | C. S. C. House. |
| Brown, Herbert Augustine, | Saxonville, | Brooks Farm. |
| Bullard, Alvan Henry, | South Framingham, | 3 North College. |
| Burby, Lawrence Walter, | Chicopee Falls, | Theta Chi House. |
| Bursley, Harold Barrows, | Peabody, | 5 North College. |
| Carver, John Stuart, | Roslindale, | C. S. C. House. |
| Clark, Norman Russell, | Millbury, | Theta Chi House. |
| Cobb, Joseph Boyd,[1] | Chicopee Falls, | 5 North College. |
| Cole, Arlin Tower, | West Chesterfield, | 2 North College. |
| Cole, Flora Atwood, | Newton, | Draper Hall. |
| Coleman, Isaac,[1] | Amherst, | 12 North College. |
| Cooper, Everett Hanson,[1] | Greenwood, | 11 North College. |
| Cory, Harold, | Rutherford, N. J., | 15 Beston Street. |
| Covill, Joseph Warren,[1] | Roxbury, | 7 South College. |
| Cristman, Clyde Edward,[1] | Dalton, | 2 North College. |
| Culley, Frank Hamilton, | Marshalltown, Ia., | 77 Pleasant Street. |
| Curtis, Harold William,[1] | Belchertown, | Entomology Building. |
| Daniel, Edward Stephen Coen, | Osterville, | 7 South College. |
| Dayton, James Wilson, | Georgetown, Conn., | 4 North College. |
| Dooley, Thomas Patrick, | South Boston, | 6 North College. |
| Drury, Lewis Floyd, | Rutland, | 120 Pleasant Street. |
| Edminster, Albert Franklin, | Brooklyn, N. Y., | 5 South College. |
| Eisenhaure, John Louis,[1] | North Reading, | 3 North College. |
| Ellis, Benjamin Ward, | Plymouth, | Kappa Sigma House. |
| Ells, Gordon Waterman, | Haverhill, | 5 South College. |
| Fay, Robert Sedgwick, | Monson, | 84 Pleasant Street. |
| Forbush, Wallace Clifford, | Rutland, | 79 Pleasant Street. |
| French, James Dudley, | Hyde Park, | 8 South College. |
| Gaskill, Ralph Hicks, | Amherst, | 15 Hallock Street. |
| Gore, Harold Martin, | Wollaston, | 11 South College. |
| Greenleaf, George Freeman, | Brockton, | 21 Fearing Street. |
| Griggs, Frederick David, | Chicopee Falls, | 18 South College. |
| Harris, Burton Adams, | Wethersfield, Conn., | 11 North College. |
| Hasey, Willard Harrison,[1] | Campello, | C. S. C. House. |
| Hatch, Herbert Tilden, | Atlantic, | East Experiment Station. |
| Headle, Herbert Wallace, | Bolton, | North College. |
| Headle, Marshall, | Bolton, | French Hall. |
| Holden, James Loomis, | Palmer, | 3 North College. |
| Howe, Glover Elbridge, | Marlborough, | 11 South College. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Howe, Ralph Wesley, | East Dover, Vt., | Wilder Hall. |
| Huntington, Samuel Percy, | Lynn, | 12 South College. |
| Hutchings, Herbert Colby,[1] | South Amherst, | 9 North College. |
| Hyland, Harold Wilson,[1] | Weymouth, | Old Insectary. |
| Jones, Harold Frederic, | Campello, | West Experiment Station. |
| Jordan, Simon Miller,[1] | Rutherford, N. J., | 9 South College. |
| Kelley, Albert Joseph, | Roxbury, | 1 North College. |
| Kelley, Bernard Jenkins, | Harwichport, | Brooks Farm. |
| Kenney, Frederick Alfred,[1] | Charlestown, | South College Tower. |
| Lesure, John Warren Thomas, | Fitchburg, | Flint Laboratory. |
| Little, Willard Stone,[1] | Newburyport, | 6 South College. |
| Lowry, Quincy Shaw,[1] | Canton, | 6 South College. |
| Lundgren, Arthur Robert,[1] | Orange, | Theta Chi House. |
| Lyon, Harold, | Somerville, | 13 Phillips Street. |
| Macone, Joseph Augustine, | Concord, | 4 South College. |
| Mallett, George Alfred, | Bridgeport, Conn., | 9 North College. |
| Matz, Julius,[1] | Lynn, | 112 Pleasant Street. |
| Mayer, John Lawrence, | South Boston, | 1 North College. |
| McDougall, Allister Francis, | Westford, | 18 South College. |
| Moir, William Stuart, | Boston, | Theta Chi House. |
| Murray, Joseph Wilbur, | Holyoke, | Kappa Sigma House. |
| Neal, Ralph Thomas, | Mattapan, | Old Insectary. |
| Nichols, Norman Joseph, | Everett, | Physics Building. |
| O'Brien, James Leo, | Wayland, | 10 South College. |
| Packard, Clyde Monroe, | Springfield, | 84 Pleasant Street. |
| Pease, Lester Newton, | Meriden, Conn., | 17 South College. |
| Pillsbury, Joseph James,[1] | West Bridgewater, | 8 South Prospect St. |
| Post, George Atwell,[1] | Richmond Hill, N. Y., | Theta Chi House. |
| Roehrs, Herman Theodore, | New York, N. Y., | Kappa Sigma House. |
| Rosebrooks, Walter Edwin,[1] | Essex, | 14 North College. |
| Samson, Stuart Dodds, | Grand Isle, Vt., | 12 South College. |
| Selden, John Lincoln, | Northampton, | 21 Fearing Street. |
| Serex, Paul, Jr., | Jamaica Plain, | 14 North College. |
| Sheehan, Dennis Anthony,[1] | South Lincoln, | 1 North College. |
| Shute, Carl August,[1] | Quincy, Ill., | 14 South College. |
| Streeter, Charles Marsh, | Brimfield, | 79 Pleasant Street. |
| Thayer, Clark Leonard, | Smith's, | 8 North College. |
| Tucker, Waldo Guy, | Lynn, | Physics Building. |
| Van Zwaluwenburg, Reyer Herman, | Rutherford, N. J., | 17 South College. |
| Walker, Charles Dexter, | Greenwich Village, | 14 South College. |
| Whitney, Francis Wellington,[1] | Wellesley, | 4 North College. |
| Zabriskie, George, 2d,[1] | New York, N. Y., | 8 South College. |

### JUNIOR CLASS.

| | | |
|---|---|---|
| Abbott, Leslie Elmer, | Sandwich, | 10 North College. |
| Allen, Carl Murdough, | Holyoke, | 87 Pleasant Street. |
| Anderson, Leslie Oscar,[1] | Concord, | 101 Pleasant Street. |
| Baker, Warren Sears, | Wollaston, | 8 South College. |
| Black, Harold Cotting,[1] | Falmouth, | Kappa Sigma House. |
| Blake, Ralph Cedric,[1] | Wollaston, | 15 Hallock Street. |
| Bokelund, Chester Story,[1] | Worcester, | 10 South College. |
| Bradley, John Watling,[1] | Groton, | 88 Pleasant Street. |
| Bragg, Ralph Stanley, | Milford, | Care of Professor White. |
| Brewer, Harold William,[1] | Mount Vernon, N.Y., | C. S. C. House. |
| Brooks, Arthur Winslow, | Enfield, | 79 Pleasant Street. |
| Brown, Harry Dunlap,[1] | Lowell, | Kappa Sigma House. |
| Calvert, Melville Bradford, | New London, Conn., | 58 Pleasant Street. |
| Campbell, Malcolm David, | Still River, | Poultry Building. |
| Christie, Edward Wheeler, | North Adams, | P. O. Box 152. |
| Churchill, George Clarence, | Worcester, | 58 Pleasant Street. |
| Clark, Ernest Samuel, Jr., | Tolland, | 82 Pleasant Street. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Clay, Harold Johnson, | North Cambridge, | 21 Fearing Street. |
| Clegg, Frank Jackson,[1] | Fall River, | 2 South College. |
| Coe, Alfred Lynn, | Fayetteville, N. Y., | 79 Pleasant Street. |
| Cole, Herbert Elmer,[1] | Manchaug, | Plant House. |
| Coleman, David Augustus, | South Framingham, | 108 Pleasant Street. |
| Davies, Lloyd Garrison, | Peabody, | 15 South College. |
| Davis, Ralph Edward,[1] | Southbury, Conn., | 77 Pleasant Street. |
| Davis, William Ashmun, | Northfield, | 79 Pleasant Street. |
| Dearing, Newton Howard,[1] | Brookline, | 7 Nutting Avenue. |
| Demond, Robert Norton, | North Adams, | 16 South College. |
| Dexter, Evans King,[1] | Mattapoisett, | Theta Chi House. |
| Dunbar, Erving Walker, | Weymouth, | 116 Pleasant Street. |
| Edgerton, Almon Morley,[1] | West Springfield, | 13 South College. |
| Edwards, Edward Clinton,[1] | Salem, | 16 South College. |
| Eldridge, Harold Lockwood,[1] | Wareham, | 88 Pleasant Street. |
| Foster, Stuart Brooks,[1] | West Somerville, | Kappa Sigma House. |
| Freeborn, Stanley Barron, | Ware, | 116 Pleasant Street. |
| Freedman, Samuel Leavitt, | Roxbury, | 101 Pleasant Street. |
| Frye, Carl Raymond, | South Hadley Falls, | 116 Pleasant Street. |
| Fuller, George, | Deerfield, | 86 Pleasant Street. |
| Griffin, William Gerald, | South Hadley Falls, | South Hadley Falls. |
| Hadfield, Harold Frederick, | North Adams, | East Pleasant Street. |
| Handy, Ralph Ellis,[1] | Cataumet, | 10 North College. |
| Harris, Rodney Wells, | Wethersfield, Conn., | 77 Pleasant Street. |
| Hazen, Edward Leonard,[1] | Springfield, | Care of E. H. Forristall. |
| Hebard, Emory Blodgett,[1] | Fiskdale, | 3 Fearing Street. |
| Heffron, Frederick, | Sherborn, | 108 Pleasant Street. |
| Hogg, Lawrence Jagger,[1] | Lawrence, | Pease Avenue. |
| Howard, Louis Phillips, | North Easton, | 19 Hallock Street. |
| Hutchinson, John Gouverneur, | Arlington, | 15 South College. |
| Ingham, Earl Morris, | Granby, | 86 Pleasant Street. |
| Jacobs, Loring Humphrey,[1] | Wellesley, | 25 Pleasant Street. |
| Jenney, Herbert Hedge,[1] | South Boston, | 6 Nutting Avenue. |
| Johnson, Rollin Eugene,[1] | Templeton, | 120 Pleasant Street. |
| Jones, Dettmar Wentworth,[1] | Melrose, | 66 Pleasant Street. |
| Leete, Richard Fowler,[1] | Mount Kisco, N. Y., | 81 Pleasant Street. |
| Levine, Henry Walter,[1] | Roxbury, | 101 Pleasant Street. |
| Lincoln, Murray Danforth, | North Raynham, | 19 Hallock Street. |
| Lucas, Hoyt Dennis, | West Springfield, | 1 Allen Street. |
| Major, Joseph, | Rutherford, N. J., | 58 Pleasant Street. |
| Marsh, Frank Eugene, | Jefferson, | 79 Pleasant Street. |
| Merkle, Frederick Grover, | Amherst, | North East Street. |
| Morrison, Harold Ivory, | Melrose, | 77 Pleasant Street. |
| Morse, Harold John,[1] | Townsend, | 75 Pleasant Street. |
| Needham, Lester Ward,[1] | Springfield, | Kappa Sigma House. |
| Nicolet, Theodore Arthur,[1] | Fall River, | Flint Laboratory. |
| Nicolet, Tell William, | Fall River, | C. S. C. House. |
| Nissen, Harry, | Boston, | 85 Pleasant Street. |
| Norton, Leslie Howard, | Newport, R. I., | 79 Pleasant Street. |
| Nute, Raymond Edson, | Fall River, | 9 Fearing Street. |
| Oertel, John Thomas,[1] | South Hadley Falls, | 116 Pleasant Street. |
| Parker, Ervine Franklin, | Poquonock, Conn., | Kappa Sigma House. |
| Payne, Roland Alfred, | Wakefield, | North Amherst. |
| Pellett, John Doubleday, | Worcester, | 16 North College. |
| Peters, Chester Harry, | Brown's Station, N. Y., | 116 Pleasant Street. |
| Petersen, Peveril Oscar,[1] | Concord, | 9 Fearing Street. |
| Porter, Bennett Allen, | Amherst, | Hatch Barn. |
| Powers, Richard Henry,[1] | Malden, | Veterinary Laboratory. |
| Read, Frederick William,[1] | Boston, | Telephone, Amherst, 380 |
| Reid, George Alexander, | Worcester, | Care of E. M. Dickinson. |
| Russell, Alden Hesseltine, | Watertown, | 116 Pleasant Street. |
| Sahr, Gabriel Arthur,[1] | Boston, | 15 Phillips Street. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Sherman, Joel Powers, | Hyannis, | 9 South College. |
| Shirley, John Newton, | South Duxbury, | 30 North Prospect Street. |
| Small, Francis Willard,[1] | North Truro, | 120 Pleasant Street. |
| Smith, Leon Edgar, | Boston, | 2 South College. |
| Smith, Leone Ernest, | Leominster, | 116 Pleasant Street. |
| Stevens, Arthur Eben, | Brockton, | Beta Kappa Phi House. |
| Strange, Sarah Josephine, | Marshfield, | Draper Hall. |
| Tarbell, Munroe Gifford,[1] | Brimfield, | 10 North College. |
| Taylor, Arthur Wright, | Feeding Hills, | 3 Nutting Ave. |
| Taylor, Leland Hart, | Peabody, | 13 South College. |
| Thurston, Arthur Searle, | Everett, | 9 Fearing Street. |
| Tower, Alfred Leigh, | Sheffield, | 120 Pleasant Street. |
| Upton, Ernest Franklin, | Salem, | Care of R. J. Watts. |
| Walker, Nathaniel Kennard, | Malden, | 16 North College. |
| Walker, Raymond Philip, | Taunton, | 83 Pleasant Street. |
| Warner, Raymond Winslow, | Sunderland, | 77 Pleasant Street. |
| Webster, Louis Armstrong, | Blackstone, | 82 Pleasant Street. |
| Weigel, Arthur George, | Lawrence, | Care of Captain Martin. |
| Wheeler, Chester Eaton, | Lowell, | 87 Pleasant Street. |
| Whidden, Burton Clark,[1] | Townsend, | 81 Pleasant Street. |
| Whippen, Charles Warren, | Lynn, | 13 Phillips Street. |
| Wing, John Govan,[1] | Somerville, | 116 Pleasant Street. |
| Wood, Henry Joseph, | Mendon, | 82 Pleasant Street. |

## SOPHOMORE CLASS.

| | | |
|---|---|---|
| Alden, Charles Harold,[1] | Amherst, | East Pleasant Street. |
| Allen, Francis Ellwood, | Melrose, | 10 Allen Street. |
| Anderson, Herbert Henry, | Ware, | 19 Pleasant Street. |
| Archibald, Herbert Hildreth, | Waltham, | Care of R. J. Watts. |
| Baird, Earle Fairbank,[1] | Waltham, | 15 Beston Street. |
| Banister, Seth Warrener, | Westford, | 14 Nutting Avenue. |
| Bartlett, Emory Haynes,[1] | Enfield, | 12 Cottage Street. |
| Bartlett, Edward Russell, | Newburyport, | 66 Pleasant Street. |
| Bartley, Hastings Newcomb,[1] | Sandwich, | 66 Pleasant Street. |
| Bemis, Willard Gilbert,[1] | North Brookfield, | 12 Cottage Street. |
| Bennett, John Ingram, | Boston, | 66 Pleasant Street. |
| Bishop, Chester Allen,[1] | Peterboro, N. H., | C. S. C. House. |
| Boyer, Edward Everett Hale,[1] | Lynn, | 67 East Pleasant Street. |
| Braley, Merton Loring, | Rock, | 52 Amity Street. |
| Bronson, Harold Julius, | Buckland, | Brooks Farm. |
| Brooks, Gardner Milton, | Newton, | 8 Allen Street. |
| Buell, Frank Weed,[1] | Brooklyn, N. Y., | 83 Pleasant Street. |
| Buttrick, John Willard, | Melrose, | 16 Nutting Avenue. |
| Cale, Gladstone Hume,[1] | West Springfield, | 79 Pleasant Street. |
| Callard, John Case,[1] | Winthrop, | Care of President Butterfield. |
| Cande, Donald Hopkins,[1] | Pittsfield, | 87 Pleasant Street. |
| Chase, Alexander Baxter, Jr., | West Barnstable, | Clark Hall. |
| Churchill, Chester Albert,[1] | Brockton, | 18 Nutting Avenue. |
| Clark, Ellis Fred, | Granby, Conn., | Theta Chi House. |
| Clark, Saxon Dickinson, | Springfield, | 19 Phillips Street. |
| Cleveland, Waldo Atwood, | Baldwinsville, | 14 Nutting Avenue. |
| Clough, Maurice Joseph, | Needham, | 84 Pleasant Street. |
| Dalrymple, Andrew Campbell, | Revere, | 3 McClellan Street. |
| Damon, Leon Blanchard, | Melrose, | Nutting Avenue. |
| Day, George Allen, | Warren, | 12 Cottage Street. |
| Dole, Sumner Alvord, | Bardwell's Ferry, | 79 Pleasant Street. |
| Donnell, George Edwin, | Burlington, | East Experiment Station. |
| Doran, William Leonard, | North Dartmouth, | Plant House. |
| Draper, Earle Sumner, | Milford, | C. S. C. House. |
| Farrar, Stuart Kittridge, | Springfield, | Kappa Sigma House. |
| Fitzgerald, Daniel James,[1] | Worcester, | 75 Pleasant Street. |

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[1] Work incomplete.

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|---|---|---|
| Flebut, Alpha John, | Amherst, | 27 McClellan Street. |
| Frost, Robert Theodore, | New York, N. Y., | C. S. C. House. |
| Fuller, Richard, | Salem, | West Experiment Station. |
| Gare, Edward John, Jr.,[1] | Northampton, | 13 Phillips Street. |
| Goodwin, Malcolm Noyes, | Newburyport, | Kappa Sigma House. |
| Graham, Lucius Henry,[1] | Boston, | Pleasant Street, care of Mrs. Clutia. |
| Grant, Harold Davidson, | Methuen, | 3 McClellan Street. |
| Grebin, Mark Anthony,[1] | North Hadley, | North Hadley. |
| Griggs, Raymond Bradford,[1] | Chicopee Falls, | 84 Pleasant Street. |
| Hall, George Morris, | Brookline, | 31 East Pleasant Street. |
| Hall, Roderick Chesley, | Worcester, | 79 Pleasant Street. |
| Harper, James Edward, | New Haven, Conn., | Kappa Gamma Phi House. |
| Harper, Raymond Wires, | Barre, | 94 Pleasant Street. |
| Harvey, Russell Wilton,[1] | Lanesville, | 44 Pleasant Street. |
| Haskell, Willis Henry, Jr.,[1] | Brooklyn, N. Y., | 116 Pleasant Street. |
| Hatfield, William Hollis, | Wellesley, | 87 Pleasant Street. |
| Hathaway, Isaac,[1] | Kingston, | 96 Pleasant Street. |
| Hildreth, Paul Hughes,[1] | Newtonville, | 8 Allen Street. |
| Hill, Charles Chase,[1] | Melrose Highlands, | Pease Avenue. |
| Hotis, Ralph P., | Evans Mills, N. Y., | 20 Amity Street. |
| Hyde, George Frederic, | North Dana, | 79 Pleasant Street. |
| Hyde, Harold Gilmore, | Winchendon, | 36 North Prospect Street. |
| Johnson, Arthur, | Bridgeport, Conn., | 12 South College. |
| Jordan, Perley Balch,[1] | Topsfield, | 15 Beston Street. |
| Kelleher, Jerome Joseph. | Montague City, | 75 Pleasant Street. |
| Kennedy, Thomas James, | South Hadley Falls, | 35 East Pleasant Street. |
| Kennedy, Worthington Chester, | Hardwick, | 101 Pleasant Street. |
| Koplovitz, Samuel, | Chelsea, | 29 Lincoln Avenue. |
| Lane, Merton Chesleigh, | South Duxbury, | Care of L. A. Root. |
| LeDuc, Ashley Cudworth,[1] | Chesterfield, | 19 Pleasant Street. |
| Lewis, Daniel James, | Hanson, | Kappa Sigma House. |
| Lewis, John Kirby,[1] | New Haven, Conn., | Care of E. M. Dickinson. |
| Lincoln, Irving Boin,[1] | Glens Falls, N. Y., | Care of President Butterfield. |
| Little, Harold Greenleaf,[1] | Newburyport, | Kappa Sigma House. |
| Lovejoy, John Sumner, | Newburyport, | 53 Lincoln Avenue. |
| MacNeil, Ralph Langdel, | Chelsea, | 21 Amity Street. |
| Macy, Philip Arthur, | Oak Bluffs, | 53 Lincoln Avenue. |
| Marsh, Franklin Winter, | Amherst, | 16 Nutting Avenue. |
| Marsh, Herbert Verner, | Deerfield, | 79 Pleasant Street. |
| Masse, Sidney Merton, | Dorchester, | 3 McClellan Street. |
| McKechnie, Ray Farrar, | Natick, | 5 McClellan Street. |
| McLain, Ralph Emerson, | Melrose, | 66 Pleasant Street. |
| Melican, George Deady,[1] | Worcester, | 66 Pleasant Street. |
| Melloon, Ralph Reid,[1] | Lowell, | Kappa Sigma House. |
| Moberg, Eldon Samuel, | Campello, | 18 Nutting Avenue. |
| Montague, Enos James, | Northampton, | 13 Phillips Street. |
| Moore, Roger Henry, | Beverly, | 66 Pleasant Street. |
| Navas, Miguel,[1] | Barranquilla, Col., S. A., | 120 Pleasant Street. |
| O'Brien, Daniel William,[1] | Wayland, | New Apiary. |
| Parker, Edwin Kenney,[1] | Northampton, | 77 South Pleasant Street. |
| Parmenter, Ernest Brigham,[1] | Dover, | 79 Pleasant Street. |
| Patten, Merrill Campbell, | Brighton, | 31 East Pleasant Street. |
| Patterson, Robert Earley, | Dorchester, | 75 Pleasant Street. |
| Pendleton, Harlow Libby,[1] | Dorchester, | 16 Nutting Avenue. |
| Perry, Gerald Eugene, | Amherst, | Prospect House. |
| Pike, Joseph Stevens, Jr., | Somerville, | 3 Nutting Avenue. |
| Potter, George Raymond,[1] | Ludlow, | 44 Pleasant Street. |
| Price, James Albert, | New York, N. Y., | 15 Beston Street. |
| Rhoades, Paul Whitney, | Malden, | 2 Allen Street. |
| Rogers, Harold Merriman, | Southington, Conn., | 87 Pleasant Street. |
| Sauchelli, Vincent, | Waterbury, Conn., | 11 High Street. |

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[1] Work incomplete.

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|---|---|---|
| Scott, Lincoln Bain,[1] | Melrose, | 3 McClellan Street. |
| Sears, William Richard, | Arlington, | 84 Pleasant Street. |
| Severance, Verne Lincoln, | South Hanson, | Care of L. A. Root. |
| Sherman, Milton Francis, | South Lincoln, | 10 Allen Street. |
| Simon, Isaac Barney,[1] | Revere, | 38 Cottage Street. |
| Slein, Owen Francis, | New Braintree, | 127 South Pleasant Street. |
| Smith, Himan,[1] | Worcester, | 8 Allen Street. |
| Spofford, Chester Porter, | Georgetown, | 5 McClellan Street. |
| Strauss, Abraham,[1] | Boston, | 101 Pleasant Street. |
| Taft, Richard Craig,[1] | Oxford, | 84 Pleasant Street. |
| Tarr, Lester Winslow,[1] | Rockport, | 44 Pleasant Street. |
| Tonry, Albert Joseph Paul,[1] | Winthrop, | Durfee Plant House. |
| Tower, Ralph Ernest, | Becket, | 120 Pleasant Street. |
| Tower, William Reginald, | Sheffield, | 94 Pleasant Street. |
| Towne, Edwin Chester,[1] | Waltham, | C. S. C. House. |
| Upton, Raymond Melville, | Peabody, | 87 Pleasant Street. |
| Vener, Benjamin, | Brockton, | 38 Cottage Street. |
| Vinal, Stuart Cunningham, | East Weymouth, | 9 Allen Street. |
| Wellington, Benjamin, | Waltham, | 10 Allen Street. |
| White, Homer Beethoven, | Melrose, | 10 Allen Street. |
| White, Henry Harrison, | West Peabody, | 79 Pleasant Street. |
| Whitmore, Philip Ferry, | Sunderland, | 13 Phillips Street. |
| Whorf, Paul Francis, | Hyde Park, | 87 Pleasant Street. |
| Wilkins, Alfred Emerson, | Wakefield, | 116 Pleasant Street. |
| Willey, Harold Cleland Clancy, | Orange, | Care of E. F. Gaskill. |
| Williams, Donald, | Catasauqua, Pa., | C. S. C. House. |
| Woodman, Edward, Jr.,[1] | Portland, Me., | 15 Gaylord Street. |
| Wright, Elvin Stanley, | Worcester, | 15 Fearing Street. |

### FRESHMAN CLASS.

| | | |
|---|---|---|
| Aiken, Harold, | Millis, | 29 McClellan Street. |
| Allen, Chester King, | Quincy, | Brooks Farm. |
| Anderson, Frank Albert,[1] | Somerville, | 13 Phillips Street. |
| Andrews, Francis Marshall, Jr., | Manchester, | 53 Lincoln Avenue. |
| Barnes, Fred Leslie, | Plymouth, | 7 Nutting Avenue. |
| Bean, Harold John,[1] | Haverhill, | Care of E. F. Gaskill. |
| Beeler, Leon Charles,[1] | Adams, | 75 Pleasant Street. |
| Bishop, Herbert Walker,[1] | Doylestown, Pa., | C. S. C. House. |
| Bisbee, Philip Emerson, | Waitsfield, Vt., | East Pleasant Street. |
| Blanpied, Nelson Uhler, | Framingham, | Care of Mr. Forristall. |
| Bradley, William George, | Groton, | 31 East Pleasant Street. |
| Brazil, William Henry, | Leominster, | 116 Pleasant Street. |
| Brush, David Carey, | Vineyard Haven, | 19 Phillips Street. |
| Burnham, Chester Arthur, | Westford, | Brooks Farm. |
| Burt, Warner Howard, | Longmeadow, | 6 Nutting Avenue. |
| Caldon, John Jeremiah, | West Springfield, | – – |
| Caldwell, Harold Nute, | Lowell, | 3 Nutting Avenue. |
| Cardarelli, Emilio Joseph, | Boston, | 31 North Prospect Street. |
| Carruth, Glenn Howard, | Orange, | 34 North Prospect Street. |
| Carver, Frank Whitney, | Plymouth, | 7 Nutting Avenue. |
| Cate, Rex March, | Canton, | 3 Nutting Avenue. |
| Chamberlin, Raymond, | Rutherford, N. J., | 82 Pleasant Street. |
| Chisholm, Raymond Lincoln, | Melrose Highlands, | 66 Pleasant Street. |
| Choate, Carlisle Edward, | Boston, | 15 Phillips Street. |
| Clapp, Raymond Luckey,[1] | Northfield, | Brooks Farm. |
| Clough, Charles Henry, | Dedham, | 35 East Pleasant Street. |
| Cobban, Donald Stickney,[1] | Groveland, | Mt. Pleasant. |
| Coleman, Albert Sumner, | Mendon, | 15 Hallock Street. |
| Coley, William Stanton, | Wilton, Conn., | 36 North Prospect Street. |
| Courchene, Alcide Telesphor,[1] | North Adams, | 14 Nash Block. |
| Curran, Harry Ambrose, | Marlborough, | Taylor Farm. |

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[1] Work incomplete.

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|---|---|---|
| Curtin, Charles Warren, | Auburndale, | 15 Hallock Street. |
| Cushing, Raymond Alonzo, | Somerville, | 13 Phillips Street. |
| Danforth, George Newlan, | Foxcroft, Me., | 82 Pleasant Street. |
| Davis, Frank Leslie, | South Hopedale, | Care of E. F. Gaskill. |
| Dickinson, William Cowls, | North Amherst, | North Amherst. |
| Dine, Hyman Bertram, | Boston, | 35 South Pleasant Street. |
| Dinsmore, Donald Sanderson, | Springfield, | 6 Nutting Avenue. |
| Doggett, William Henry,[1] | Dedham, | 35 East Pleasant Street. |
| Doherty, Paul Edward,[1] | Fall River, | East Pleasant Street. |
| Duffill, Edward Stanley,[1] | Greenwood, | Care of L. A. Root. |
| Dumas, Walter Branca,[1] | Boston, | 35 East Pleasant Street. |
| Dunbar, Henry Hart, | Taunton, | 83 Pleasant Street. |
| Edwards, Maurice Millett, | Lawrence, | 25 Pleasant Street. |
| Eldredge, Raymond Chase, | No. Abington, | 30 North Prospect Street. |
| Eldridge, Clarence Crocker, | Natick, | 52 Lincoln Avenue. |
| Epstein, Harry Browdy, | Amherst, | 38 Cottage Street. |
| Fernald, Charles Henry, | Amherst, | 44 Amity Street. |
| Fielding, Lester Edward, | Malden, | 2 Allen Street. |
| Fisher, George Basil, | Millbury, | Care of E. F. Gaskill. |
| Fox, Edward Lawrence,[1] | Winthrop, | 29 McClellan Street. |
| Francis, Charles Davis, | Cranford, N. J., | 25 Pleasant Street. |
| Gaventa, Harry Reymer, | Repaupo, N. J., | 35 East Pleasant Street. |
| Gilmore, Benjamin Anthony, | Acushnet, | 40 Amity Street. |
| Gioiosa, Alfred Anthony, | Dorchester, | Brooks Farm. |
| Glover, Theodore Whitford, | South Duxbury, | Care of L. A. Root. |
| Goodwin, Clinton Foster, | Haverhill, | 7 Nutting Avenue. |
| Googins, Burton, | Brooklyn, | 52 Lincoln Avenue. |
| Gordon, Lewis Sanford, Jr., | Clinton, | Care of Dr. Gordon. |
| Gould, Charles Holt,[1] | Worcester, | 66 Pleasant Street. |
| Graves, Ralph Wheeler, | Shelburne Falls, | 40 Amity Street. |
| Gray, Frank Lyman, | Shelburne Falls, | North Amherst. |
| Gunn, Carlton Merrick, | Sunderland, | 3 Nutting Avenue. |
| Hager, Clayton Marden, | Somerville, | 3 Nutting Avenue. |
| Hall, Stanley William, | Saxonville, | Brooks Farm. |
| Harlow, Nathaniel Luzerne,[1] | Amherst, | 7 Parsons Street. |
| Harriman, Chester Karl, | Exeter, N. H., | 36 North Prospect Street. |
| Harris, William Lombard, Jr., | Deerfield, | 53 Lincoln Avenue. |
| Harrocks, Thomas Lincoln, | Westminster, | 36 North Prospect Street. |
| Hart, Reginald, | Montague City, | 53 Lincoln Avenue. |
| Haskell. Frank Eugene, | Northborough, | Care of C. R. Greene. |
| Hathaway, Charles Edward, | Somerset, | 19 Phillips Street. |
| Hemenway, Justin Stanley, | Williamsburg, | Brooks Farm. |
| Hendry, Arthur Ekman,[1] | Mattapan, | 16 Nutting Avenue. |
| Hobart, Ralph Edmund, | North Amherst, | North Amherst. |
| Holden, Mae Faustina, | Royalston, | Care of President Butterfield. |
| Hulsizer, Allan Lynne, | Flemington, N. J., | 29 North Prospect Street. |
| Hunt, Reginald Stuart, | Bridgewater, | 53 Lincoln Avenue. |
| Huntington, Charles Albert, Jr., | Poquonock, Conn., | 82 Pleasant Street. |
| Jenna, William Wallace,[1] | Athol, | 116 Pleasant Street. |
| Jerome, Frederick William,[1] | Stockbridge, | 40 Amity Street. |
| Jones, Linus Hale, | Milford, | Care of C. R. Greene. |
| Kaplan, Barney, | Malden, | 38 Cottage Street. |
| Keegan, Frank Champion,[1] | Turners Falls, | 75 Pleasant Street. |
| Keegan, Thomas Michael,[1] | Worcester, | 75 Pleasant Street. |
| Kelly, Harold Russell, | Haverhill, | 15 Gaylord Street. |
| Kennedy, George William, | Sayville, L. I., | 7 Nutting Avenue. |
| Kilbon, Ralph Gillette,[1] | Springfield, | Brooks Farm. |
| King, Edward Lee, | Dorchester, | Brooks Farm. |
| Kinsman, Alfred Oberlin, Jr., | Merrimac, | – – |
| Kitsis, Henry Hyman,[1] | Boston, | 41 Pleasant Street. |
| Knapton, Guy Lord, | Lawrence, | Pease Avenue. |
| Laird, Kenneth Bradford, | Brockton, | 36 North Prospect Street. |

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[1] Work incomplete.

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|---|---|---|
| Lamoureux, Domina Joseph, | Adams, | 75 Pleasant Street. |
| Lehman, Walter Ernest, | Worcester, | East Pleasant Street. |
| Lieber, Conrad Hugo,[1] | Jamaica Plain, | 31 North Prospect Street. |
| Lindquist, Albert Evert,[1] | Jamaica Plain, | 5 McClellan Street. |
| Locke, Wilbur Trow, | Lawrence, | 25 Pleasant Street. |
| Lyford, Waldo Preston, | Natick, | 52 Lincoln Avenue. |
| MacDonald, Norman Duncan, | Melrose, | College Store. |
| Mahony, William John, | Winthrop, | 29 McClellan Street. |
| Mann, Victor Leslie, | Millers Falls, | 13 Phillips Street. |
| Marshall, Earl LeForest, | Neponset, | Hadley. |
| Mattoon, Harold Gleason, | Pittsfield, | 87 Pleasant Street. |
| Maynard, Harlan Slade,[1] | Jefferson, | Care of R. J. Goldberg. |
| McCulloch, Norman Estes, | Pawtucket, R. I., | Care of Professor Morton. |
| Meade, Joseph Williams,[1] | West Springfield, | Care of Mrs. Hill, Nutting Avenue. |
| Mimitz, Joseph Raymond,[1] | Hadley, | Hadley. |
| Montgomery-Peter, Thomas M., | Philadelphia, Pa., | 15 Phillips Street. |
| Mooney, Raymond A.,[1] | Plattsburgh, N. Y., | 12 Hallock Street. |
| Morton, Walter Joseph,[1] | Jamaica Plain, | Care of Mrs. Gibbs. |
| Moses, Charles Wicker, | Ticonderoga, N. Y., | 7 Nutting Avenue. |
| Moss, Earle Chester,[1] | Worcester, | Care of Mrs. Gibbs. |
| Mostrom, Harold Augustus, | Somerset, | 36 North Prospect Street. |
| Murphy, John William, | Beverly, | 15 Beston Street. |
| Nash, Clayton Wells, | South Weymouth, | 7 Nutting Avenue. |
| Nestle, William John,[1] | Amherst, | Amherst. |
| Nicholson, James Thomas, | Leominster, | 116 Pleasant Street. |
| Noyes, Samuel Verne,[1] | Georgetown, | 36 North Prospect Street. |
| O'Brion, Edwin Fulton, | Somerville, | 83 Pleasant Street. |
| Oertel, August Leonard,[1] | South Hadley Falls, | South Hadley Falls. |
| Palmer, George Bradford, | Brookline, | Care of E. F. Gaskill. |
| Phelps, Sanford Wallace, | Turners Falls, | 35 East Pleasant Street. |
| Pierce, James Dwight,[1] | Springfield, | Care of E. H. Forristall. |
| Plaisted, Philip Asbury, | Arlington, | 77 Pleasant Street. |
| Porter, Philip Clayfield, | West Springfield, | 79 Pleasant Street. |
| Potash, Philip,[1] | Boston, | 35 South Pleasant Street. |
| Potter, David, | Concord, | 40 Amity Street. |
| Pratt, Walter Howard, | Dalton, | Hallock Street and Pease Avenue. |
| Prouty, Stanley Marshall, | North Brookfield, | 12 Cottage Street. |
| Quincy, Knight, | Roslindale, | 35 East Pleasant Street. |
| Randall, Denton William, | Somerville, | – – |
| Ray, George Burrill, | Hingham, | Brooks Farm. |
| Reed, Andrew John, Jr., | Dalton, | Pease Avenue. |
| Rendall, Raymond Eaton, | Melrose, | College Store. |
| Rich, Gilbert Warren, | Hingham, | 8 Allen Street. |
| Richards, Everett Stackpole, | Northampton, | Northampton. |
| Richardson, Lewis Elmer, | Millis, | 29 McClellan Street. |
| Ricker, Dean Albert, | Worcester, | C. S. C. House. |
| Rogers, Roland Winsor,[1] | Roxbury, | 25 Lincoln Avenue. |
| Rogers, Tyler Stewart, | Saxonville, | Care of Mr. Forristall. |
| Rowe, Louis Victor,[1] | Melrose, | 18 Nutting Avenue. |
| Russell, Ernest Samuel, | Hadley, | Hadley. |
| Ryan, William Edward, Jr.,[1] | Stoughton, | 7 Nutting Avenue. |
| Sanderson, Everett Shovelton, | Centreville, R. I., | 19 Phillips Street. |
| Saunders, William Putnam, | Lawrence, | 1 Allen Street. |
| Sauter, William Hugo,[1] | Turners Falls, | 75 Pleasant Street. |
| Scheufele, Frank Joseph, | South Natick, | 52 Lincoln Avenue. |
| Schlotterbeck, Lewis,[1] | Roxbury Station, Conn., | 12 Hallock Street. |
| Schwartz, Louis, | Melrose, | 38 Cottage Street. |
| Shapiro, Frank Simon, | Lynn, | 41 Pleasant Street. |
| Sherinyan, Suran Donald, | Worcester, | Care of Mrs. Taylor, North Amherst. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Simmons, Perez,[1] | Pittsfield, | 36 North Prospect Street. |
| Smith, Horace Arthur,[1] | Newtown, Conn., | Care of Mrs. Gibbs. |
| Smith, Philip Laurence, | Kingston, | Care of Mrs. Gibbs. |
| Stanford, Ernest Elwood, | Rowe, | 71 South Pleasant Street. |
| Stearns, Frederick Campbell, | Waltham, | 40 Amity Street. |
| Stone, Albert Edwin,[1] | Worcester, | Brooks Farm. |
| Stoughton, Richard, | Montague, | 21 Fearing Street. |
| Swan, Durelle, | Dorchester Centre, | Care of Professor Morton. |
| Swift, Raymond Walter, | North Amherst, | North Amherst. |
| Taber, Ralph Fred, | Phoenix Mills, N. Y., | 77 Pleasant Street. |
| Tarbell, Herbert Hitchcock,[1] | Warren, | 12 Cottage Street. |
| Taylor, Howell,[1] | Florida, N. Y., | 7 Nutting Avenue. |
| Topham, Alfred, | Lawrence, | 31 East Pleasant Street. |
| Treat, Rutherford Sperry, | Seymour, Conn., | 7 Nutting Avenue. |
| Upham, Thomas Carlton, | Fitchburg, | 15 Hallock Street. |
| Verbeck, Howard Graves,[1] | Malden, | Care of C. R. Greene. |
| Walkden, Herbert Haldon, | Westford, | Brooks Farm. |
| Walker, Henry Marshall, | South Harwich, | Brooks Farm. |
| Walker, Robert Russell, | Mansfield, | – – |
| Warner, Lewis Pomeroy,[1] | Sunderland, | 3 Nutting Avenue. |
| Webster, Frank Cedric. | Harvard, | 35 East Pleasant Street. |
| Weisbein, Isaac, | Brooklyn, N. Y., | Care of L. A. Root. |
| Wells, Harry Andrew, | Dalton, Pa., | 5 McClellan Street. |
| Wentworth, Everett Lawrence, | East Dover, Vt., | 30 North Prospect Street. |
| Wetherbee, Raymond Scott, | Waltham, | 35 East Pleasant Street. |
| Wheeler, Chester Warren, | Southborough, | 28 Northampton Road. |
| Wheeler, Robert Kellogg, | Great Barrington, | 40 Amity Street. |
| Whitney, Leon Fradley, | Brooklyn, N. Y., | 52 Lincoln Avenue. |
| Whitney, Harold Tichenor, | Mt. Vernon, N. Y., | C. S. C. House. |
| Wies, Calmy,[1] | Malden, | 38 Cottage Street. |
| Wilcox, Timothy Palmer, | Andover, | 83 Pleasant Street. |
| Wildon, Carrick Earl, | Melrose, | 66 Pleasant Street. |

### Unclassified Students.

| | | |
|---|---|---|
| Bates, L. Emeline, | Billerica, | Draper Hall. |
| Blackhall, Allan John, | Brookline, | Care of Professor Morton. |
| Cann, Fred Hodges, | Beverly, | 44 Triangle Street. |
| Cannon, Thomas Vincent, | Newton, | 77 Pleasant Street. |
| Chambers, Maude Burdick, | Harper's Ferry, W. Va., | 8 Allen Street. |
| Comeau, Mark Walter, | Maynard, | 19 Pleasant Street. |
| Crosby, Stanley, | Warren, | Theta Delta Chi House. |
| Dearth, Newman, | Ashland, | 35 East Pleasant Street. |
| Dillon, Thomas Stevenson, | West Warren, | 101 Pleasant Street. |
| Dodd, Dexter Tiffany, | Chestnut Hill, | 83 Pleasant Street. |
| Dodge, Walter Eugene, | Geneva, O., | 14 South College. |
| Fiske, Howard Benjamin, | Passaic, N. J., | Care of Professor White. |
| Fitzgerald, William Patrick, | Worcester, | 75 Pleasant Street. |
| Fox, Everett Bailey, | Dracut, | 3 Nutting Avenue. |
| Hicks, Albert James, | Northfield, | Brooks Farm. |
| Hooper, Edward Asa, | Chestnut Hill, | 36 North Prospect Street. |
| Kendall, Edward Dana, | Holden, | Brooks Farm. |
| Lockwood, Dimon, | Boston, | Prospect House. |
| Malkasian, Nishan P., | Boston, | – – |
| MacCormac, Wm. Frederic, | Malden, | Brooks Farm. |
| Mott, Percival, | Cambridge, | 81 Pleasant Street. |
| Nixon, William Joseph, | Boston, | 101 Pleasant Street. |
| Pease, Willard Noah Morris, | Altoona, Pa., | Brooks Farm. |
| Perry, Edgar Adams, | Attleborough, | 35 East Pleasant Street. |
| Prouty, LeRoy Fletcher, | Rockland, | 31 North Prospect Street. |
| Rae, George Little, | Needham Heights, | 2 Allen Street. |
| Richards, Edwin Henry, | Hartford, Conn., | 2 Allen Street. |

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[1] Work incomplete.

| | | |
|---|---|---|
| Ridlon, Ernest Tarr, | Chelsea, | 15 Gaylord Street. |
| Taylor, Frank Reed, | Frye, Me., | 30 North Prospect Street. |
| Willard, Harold Nelson, | Baltimore, Md., | 81 Pleasant Street. |
| Winkler, Alfred, | Hackensack, N. J., | 44 Triangle Street. |

### Short Courses.

*Ten Weeks' Registration.*

| | |
|---|---|
| Abbot, Mary Perkins, | 5 Marlboro Street, Boston. |
| Allen, Walter J., | Box 76, Berlin. |
| Badger, Jos. J., | Hudson. |
| Baker, Chas. L., | 8 St. James Street, Boston. |
| Baldwin, Chas. H., | 75 Pearl Street, Boston. |
| Barker, Bowen, | 85 Forest Hills Street, Jamaica Plain. |
| Barnard, Ernest K., | Grasmere, N. H., |
| Bartlett, Allen J., | Lenox. |
| Bates, Harold, | Oxford. |
| Bigelow, Jos. S., Jr., | Cohasset. |
| Bittinger, Fritz John, | Plymouth. |
| Blodgett, W. K., | South Lincoln. |
| Borden, Aulrey W., | South Framingham. |
| Boyd, Gardner, | Dedham. |
| Bresth, Samuel, | West Acton. |
| Brewer, Leon Arthur, | Berlin. |
| Browne, W. Prichard, | New York City. |
| Caldwell, Delmont, | Dorchester. |
| Campbell, Ronald, | Wayland. |
| Cartier, Frank J., | Mittineague. |
| Chapman, Mortimer, | Richmond. |
| Chase, Chas. S., | Foxborough. |
| Clary, Dennis J., | Holyoke. |
| Coffin, Paul S., | Boston. |
| Colburn, Edw., | New Boston, N. H. |
| Cole, Harold W., | Greenbush. |
| Condon, E. F., | Great Barrington. |
| Cooley, Elbert, | New York. |
| Cooper, Herbert M., | Interlaken. |
| Cotton, Harvey, | Brighton. |
| Crowley, Jos., | Cushman. |
| Cushman, Julian H., | Bernardston. |
| Dale, Fred, | Manchester. |
| Davis, H. W., | Greenfield. |
| Davis, Walter H., | Amherst. |
| Davison, Geo. E., | Malden. |
| Deady, Nona E., | South Boston. |
| Decatur, Jos. H., | Wayland. |
| Easterbrook, I. H., | Dudley. |
| Eastman, Harold, | South Lyndeboro, N. H. |
| Farrar, A. D., | Amherst. |
| Feeney, John, Jr., | Westford. |
| Fiebiger, Peter, | Weehawken. N. J. |
| Fisher, Walter H., | Barre. |
| Fisher, E. J., | Falmouth. |
| Ford, Earl Jay, | Stockbridge. |
| Francis, Benj. A., | Rock. |
| Freeman, Jos. O.. | Dana. |
| French, Mrs. Mary B.. | Acworth, N. H. |
| Gleason, Ray E., | Dell. |
| Gopan, Sylvester, | Tarrytown, N. Y. |
| Greene, Maurice N., | Amherst. |
| Groff, Julya, | Amherst. |
| Grosvenor, Wm. H., | Auburn. |
| Gummow, Earl, | Halifax. |
| Hakes, Chauncey, | Stockbridge. |

| | |
|---|---|
| Hall, C. John, | Milton. |
| Harris, Myron A., | Farmington, Conn. |
| Hawks, Paul, | Deerfield. |
| Hendrickson, M. Louise, | Pittsfield. |
| Holbrook, Lewis, | Brooks' Farm, Amherst. |
| Howes, Leon G., | Watson. |
| Ihmsen, Chas. B., | Providence, R. I. |
| Imlay, Manning P., | Zanesville, O. |
| Jenks, E. Lawrence, | Adams. |
| Johnson, Raymond F., | North Grafton. |
| Jordan, Earl W., | West Newbury. |
| Jones, Chapin, | Tufts College. |
| Judd, Robt. S., | South Hadley. |
| Kendall, E. Dana, | Holden. |
| Kentfield, John T., | Amherst. |
| Lathe, Martha L., | Newton. |
| Lawrence, Wm. G., | Lincoln Street, Hudson. |
| Leach, C. Arthur, | South Hamilton. |
| Leithauser, G. C., | Bloomfield, N. J. |
| Lerner, Rose, | Peru. |
| Lillie, Walter P., | Peace Dale, R. I. |
| Macken, Michael, | Glendale. |
| Manton, Geo., Jr., | Eglinton, Ont. |
| Martell, Jos. A., | Southbridge. |
| McGill, Edg. J., | Beverly. |
| McGregor, Frank, | Newburyport. |
| Mead, Harlow E., | North Andover. |
| Melloon, Ralph Reid, | Lowell. |
| Messerli, R. A., | West Andover. |
| Mezit, Peter, | Damascus, Va. |
| Moyle, John, Jr., | Groton. |
| Nash, Henry C., | Amherst. |
| Newton, Lola J., | West Brattleboro, Vt. |
| Newton, R. Alb., | West Brattleboro, Vt. |
| North, John, | Richmond. |
| O'Connor, Raymond L., | Jamaica Plain. |
| Paley, Israel, | Colchester, Conn. |
| Palmer, Florence E., | Chestnut Hill. |
| Parker, Priscilla, | 100 Blue Hills, Hartford, Conn. |
| Paulson, Jos. W., | Meadowwood Farms, Cazenovia, N. Y. |
| Pearson, Edw., | Fairhaven. |
| Pease, Clarence A., | Meriden, Conn. |
| Poor, Benj. P., | North Andover. |
| Prentice, Mrs. I. S., | Springfield. |
| Prentice, I. S., | Springfield. |
| Prescott, E. Clyde, | Westford. |
| Putnam, Earl F., | Easthampton. |
| Priest, Karlton K., | Littleton. |
| Reed, Frank H., | Greenwich, Conn. |
| Rosen, Morris, | Brockton. |
| Sabine, Stephen W., | Brookline. |
| Sanford, Earle, | Springfield. |
| Simmons, Geo. Slate, | Brooklyn, N. Y. |
| Simmons, G. W., | Amherst. |
| Shaylor, F. W., | Lee. |
| Smith, E. Parker, | Holliston. |
| Smith, John A., | South Westport. |
| Snow, Linus A., | Windsor, Conn. |
| Snow, Inez J., | Windsor, Conn. |
| Story, Myron, | Chester. |
| Talbot, H. S., | South Hadley. |
| Tate, Raymond C., | Monterey. |
| Tufts, Wm., | Boston. |

| | |
|---|---|
| Turner, Harvey, | North Reading. |
| Walker, Raymond, | Greenwich Village. |
| Wall, Geo. W., | Chester, Pa. |
| Warburton, Chatterton, Jr., | Fall River. |
| Webber, Harold T., | Winchester. |
| Wetmore, C. Inglis, | Wollaston. |
| Wheeler, Caleb H., | Concord. |
| Whitby, Lawrence, | Northborough. |
| Wilson, Wm. F., | Orford, N. H. |
| Wiswall, Geo. W., | Newton Centre. |
| Wiswall, Ralph A., | Newton Centre. |
| Worthen, Stewart, | Mittineague. |

### *Apple Packing School.*

| | |
|---|---|
| Abbot, M. P., | Boston. |
| Bigelow, Jos. S., Jr., | Cohasset. |
| Boyd, Gardner, | Dedham. |
| Brown, F. Howard, | Marlborough. |
| Browne, W. P., | New York City. |
| Clark, Winslow, | Shoreham, Vt. |
| Cobb, Geo. R., | Kingston, R. I. |
| Colburn, Edw. N., | New Boston, N. H. |
| Cole, Harold W., | Greenbush. |
| Condon, C. F., | Great Barrington. |
| Critchett, E. R., | Amherst. |
| Crocker, B., | Morristown, N. J. |
| Davenport, S. L., | North Grafton. |
| Dickson, Walter A., | Harvard. |
| Easterbrook, I. H., | Dudley. |
| Granger, Helen, | Griswoldville. |
| Green, C. R., | Belchertown. |
| Kendall, E. D., | Holden. |
| Leach, C. Arthur, | South Hamilton. |
| Lord, W. E., | Newfield, Me. |
| McGill, Edg. J., | Beverly. |
| Mead, H. E., | North Andover. |
| Messerli, R. A., | West Andover. |
| Munson, Wm. A., | Littleton. |
| Paul, R. A., | Framingham. |
| Paulson, J. W., | Cazenovia, N. Y. |
| Prentice, I. S., | Springfield. |
| Putnam, E. F., | Easthampton. |
| Reynolds, L. J., | Greenwich, Conn. |
| Rogers, Geo. L., | North Wilbraham. |
| Sabin, Leroy C., | Ipswich. |
| Sabine, S. W., | Brookline. |
| Shattuck, Mrs. B. B., | West Acton, Mass. |
| Taylor, E. R., | Stow, Mass. |
| Tufts, Wm., | Boston. |
| Walker, R. C., | Greenwich, Conn. |
| Wallace, Wm. N., | Amherst. |
| Webber, H. T., | Winchester. |
| Wheeler, C. N., | Concord. |
| Whitby, L. H., | Northborough. |

### *Beekeeping Course.*

| | |
|---|---|
| Belleville, W. E., | South Chelmsford. |
| Churchill, Clarence, | Lynn. |
| Dayton, Louise M., | Boston. |
| Hartwell, Harriet, | Boston. |
| Howland, Florence B., | Revere. |
| Lockwood, D., | Amherst. |

| | |
|---|---|
| Robie, H. W., | Winona, N. H. |
| Williams, Mrs. Ada B., | Nahant. |
| Wojcik, Rev. James, | Springfield, N. Y. |
| Wood, Lawrence, | Amherst. |

### *Poultry Course.*

| | |
|---|---|
| Abbott, George H., | Brookline. |
| Adams, Rev. W. H., | Southampton. |
| Allis, Mrs. R. D., | Amherst. |
| Allis, Rufus D., | Amherst. |
| Barker, Arthur C., | Boston. |
| Barnes, Mrs. Ralph, | Andover. |
| Bosworth, W. D., | North Orange. |
| Brewer, Mrs. A. A., | Southampton. |
| Brigham, Henry, | Northampton. |
| Brooks, A. A., | Holyoke. |
| Brown, Geo. A., | Amherst. |
| Browne, L. L., | New York, N. Y. |
| Burnett, W. A., | South Hadley. |
| Byam, Mrs. D. H., | Mansfield. |
| Challis, H. E., | South Hadley. |
| Childs, Emily F., | Manomet. |
| Childs, P. B., | Manomet. |
| Churchill, Mrs. Wm. W., | Milton. |
| Clark, H. H., | Billerica. |
| Clark, Norman, | Sunderland. |
| Corliss, Oscar L., | Belchertown. |
| Cressey, George B., | Salem. |
| Davis, Mrs. E. H., | Amherst. |
| Doggett, Mary C., | Dedham. |
| Doggett, T. T., | Dedham. |
| Eldidge, Mrs. A., | Amherst. |
| Estabrook, O. B., | Hopedale. |
| Flagg, Helen L., | West Acton. |
| Forristall, Mrs. E. H., | Amherst. |
| Garabed, Mrs. D., | Worcester. |
| Gold, M. D., | Amherst. |
| Goodnow, J. S., | Amherst. |
| Griswold, A. W., | Elmwood, N. H. |
| Griswold, W. P., | Holyoke. |
| Gunn, Chas. I., | Sunderland. |
| Gunn, L. M., | Sunderland. |
| Hack, Rev. Rollin T., | Housatonic. |
| Harrison, Mrs. Walter H., | Lebanon Springs, N. Y. |
| Harrison, Walter H., | Lebanon Springs, N. Y. |
| Haven, Alta M., | Mansfield. |
| Hawthorn, Peter, | Amherst. |
| Herrick, Ralph C., | Hollis, N. H. |
| Hitchcock, Mary M., | Ware. |
| Hodder, Mrs. A. R., | Hadley. |
| Hooper, Mrs. W. H., | East Milton. |
| Hyde, Elizabeth, | Ware. |
| Jacobs, D. I., | Wellesley. |
| Jones, E. A., | New Canaan, Conn. |
| Knowles, Rev. Samuel, | Lexington. |
| Lewis, I. C., | Ulysses, Pa. |
| Lyon, Clarence W., | South Weymouth. |
| Mayerison, T. Sydney, | Lawrence. |
| Messier, A. E., | Amherst. |
| Miller, H. B., | South Hadley. |
| Miskell, T. L., | Brookline. |
| Moody, F. W., | Rutland. |
| Morgan, Susie P., | Amherst. |

| | |
|---|---|
| Morse, John E., | Hadley. |
| Neil, James J., | Lawrence. |
| Northan, H. H., | Westfield. |
| Parsons, W. E., | New Hartford, Conn. |
| Pease, Mrs. E. E., | Granby. |
| Pease, E. E., | Granby. |
| Perkins, Maude, | Newburyport. |
| Rice, W. A., | South Hadley Falls. |
| Richardson, Harriet, | South Hadley. |
| Rood, Frank W., | Southampton. |
| Shaw, Wm. E., | Belchertown. |
| Smith, Louis E., | Salem. |
| Stuart, H. W., | Amherst. |
| Sturgis, Mrs. Edward, | Andover. |
| Talbot, H. S., | South Hadley. |
| Thayer, Mrs. C. H., | Amherst. |
| Thayer, H. A., | Holyoke. |
| Speight, Thomas, | East Longmeadow. |
| Torrey, E. D., | Easthampton. |
| Warner, Merrill, | Sunderland. |
| Warner, Robt. G., | Florence. |
| White, Mrs. E. S., | Roxbury. |
| Wolcott, Oliver, | East Longmeadow. |

### SUMMARY BY CLASSES.

| | |
|---|---|
| Graduate students, | 21 |
| Senior class, | 93 |
| Junior class, | 102 |
| Sophomore class, | 125 |
| Freshman class, | 184 |
| Unclassified students, | 31 |
| Total registration, | 556 |

### GEOGRAPHICAL SUMMARY.

| | |
|---|---|
| Massachusetts, | 473 |
| New York, | 26 |
| Connecticut, | 20 |
| New Jersey, | 9 |
| Pennsylvania, | 5 |
| New Hampshire, | 4 |
| Vermont, | 4 |
| Maine, | 3 |
| Rhode Island, | 3 |
| Barbados, | 1 |
| Colombia, S. A., | 1 |
| Iowa, | 1 |
| Kentucky, | 1 |
| Maryland, | 1 |
| Mexico, | 1 |
| Ohio, | 1 |
| Virginia, | 1 |
| West Virginia, | 1 |
| Total, | 556 |

### GRADUATE STUDENTS — CANDIDATES FOR A DEGREE.

| | |
|---|---|
| Ackerman, Arthur John,<br>B.Sc., Massachusetts Agricultural College, 1912. | Worcester. |
| Anderson, David Wadsworth,<br>B.Sc., New Hampshire State College, 1910. | Manchester, N. H. |
| Bourne, Arthur Isreal,<br>A.B., Dartmouth College, 1907. | Kensington, N. H. |
| Davis, Irving Wilder,<br>B.Sc., Massachusetts Agricultural College, 1911. | Lowell. |
| Fowler, George Scott,<br>B.Sc., Massachusetts Agricultural College, 1912. | Wayland. |
| Gates, Rupert Granville,<br>Ph.B., Sheffield Scientific School, 1912. | Northampton. |
| Gilbert, George Henry,<br>Ph.B., Boston University, 1901. | Boylston. |
| Hall, Russell Bertram,<br>B.Sc., Amherst College, 1912. | Worcester. |
| Hutson, John Coghlan,<br>B.A., Oxford University, 1909. | Bridgetown, Barbados. |
| Martin, James Francis,<br>B.Sc., Massachusetts Agricultural College, 1912. | Amherst. |
| Morse, Henry Bowditch,<br>B.Sc., Massachusetts Agricultural College, 1911. | Salem. |
| Noyes, Harry Alfred,<br>B.Sc., Massachusetts Agricultural College, 1912. | Marlborough. |
| Parker, Ralph Robinson,<br>B.Sc., Massachusetts Agricultural College, 1912. | Malden. |
| Ruprecht, Rudolf William,<br>B.Sc., Rhode Island State College, 1911. | Brooklyn, N. Y. |
| Richardson, Francis Allen,<br>S.B., Harvard University, 1896. | Boston. |
| Smulyan, Marcus Thomas,<br>B.Sc., Massachusetts Agricultural College, 1909. | Amherst. |
| Thomas, Frank Lincoln,<br>B.Sc., Massachusetts Agricultural College, 1910. | Athol. |
| Tower, Daniel Gordon,<br>B.Sc., Massachusetts Agricultural College, 1912. | Roxbury. |
| Turner, Howard Archibald,<br>B.Sc., Massachusetts Agricultural College, 1912. | Dorchester. |
| Watkins, John Bedford,<br>B.Sc., Virginia Polytechnic, 1911. | Midlouthian, Va. |
| Wehle, Harry Brandeis,<br>A.B., Harvard University, 1910. | Louisville, Ky. |

### GRADUATE STUDENTS — NOT CANDIDATES FOR A DEGREE.

| | |
|---|---|
| Eaton, Marion Goodwin,<br>A.B., Radcliffe College, 1910. | Sudbury. |
| Rand, Frank Prentice,<br>A.B., Williams College, 1912. | Worcester. |

### SUMMER SCHOOL REGISTRATION, 1911.

| | |
|---|---|
| Aldrich, Helen, | Dorchester. |
| Allen, Mrs. Jas. A., | Holyoke. |
| Allis, Mrs., | Amherst. |
| Baker, Oliver A., | Kingston. |
| Barry, Mary, | Amherst. |
| Bartlett, Mrs. Eugene, | Chicago, Ill. |
| Bartlett, Rev. Eugene, | Chicago, Ill. |
| Beaumont, Louise M., | Worcester. |
| Belcher, S. Elizabeth, | Worcester. |

| | |
|---|---|
| Bennett, Alfred C., | New York City. |
| Blanchard, Lucile M., | North Uxbridge. |
| Bonsfield, Mary, | North Adams. |
| Boyd, Gardner, | Dedham. |
| Bradlee, Thomas, | Northampton. |
| Burke, E. G., | Holyoke. |
| Burnham, Jessie E., | Waltham. |
| Butcher, Gertrude, | Roxbury. |
| Carosella, Alfredo, | University of Pennsylvania, Philadelphia. |
| Car, Helen F., | Boston. |
| Case, Myra W., | West Hartford, Conn. |
| Chalmers, Helen, | New York. |
| Chalmers, Mary, | New York. |
| Cheney, Hazel Chase, | Amherst. |
| Chow, T. K., | Amherst. |
| Church, Florence A., | New York City. |
| Clark, Anna M., | New York City. |
| Cleaveland, M. N., | East Boxford. |
| Cole, Wm. Morton, | Newton Highlands. |
| Cölln, Miss M. Von, | Columbus, O. |
| Cushman, Mrs. F. P., | Springfield. |
| Cushman, F. P., | Springfield. |
| Dame, Daisy G., | West Medford. |
| Dame, Mrs. Lorin L., | West Medford. |
| Dibble, Mrs. Gertrude, | New York City. |
| Dimick, Julian A., | East Corinth, Vt. |
| Doherty, Daniel F., | Dorchester. |
| Eldidge, Mrs. Lizzie, | Amherst. |
| Epstein, Frances, | Amherst. |
| Epstein, Ida A., | Amherst. |
| Evans, Augusta D., | Northampton. |
| Farley, Chas. Judd, | Wellesley Hills. |
| Farnsworth, Earl H., | Norwood. |
| Fisher, Georgina O., | Cambridge. |
| Foley, Daniel, | Brighton. |
| Foster, Mr. C. W., | Leominster. |
| Fox, Sarah E., | Cohasset. |
| Gere, Robt. W., | Springfield. |
| Gerould, Mrs. C. W., | Cambridge. |
| Gerould, Chas. W., | Cambridge. |
| Goodnow, Edna, | Amherst. |
| Gregory, E. S., | Somerville. |
| Groff, J. G., | Amherst. |
| Hall, E. Josephine, | Waltham. |
| Hea, Emily N., | Medford. |
| Heidenheim, Hannah, | Brooklyn, N. Y. |
| Hewins, Alice E., | Dedham. |
| Hidden, Mrs. W. H., | Cambridge. |
| Hidden, W. H., Jr., | Cambridge. |
| Holloway, Rev. Wm. H., | Thomasville, Ga. |
| Howard, Mildred, | North Amherst. |
| Hoyt, Mrs. Laura A., | Greenfield. |
| Hurd, Mrs. Wm., | Amherst. |
| Johnson, Bertha L., | Bristol, Conn. |
| Kellogg, Ella, | North Amherst. |
| Kennedy, H. A., | East Weymouth. |
| Levin, Ethel, | Amherst. |
| Liang, F. T., | Amherst. |
| Liang, Yii Cho, | Amherst. |
| Lew, Gerard N., | Amherst. |
| Lovell, Mary E., | Wayland. |
| Lyman, Harriet E., | Boston. |
| Macdonald, Chas. D., | New York City. |

| | |
|---|---|
| McKeen, Mrs. Teresa F., | Allston. |
| Macomber, Lucy S., | North Westport. |
| Maloney, Margaret, | Amherst. |
| Manoukian, V. M., | Boston. |
| March, Mrs. Clement, | Arlington. |
| Matthews, Enid, | Cambridge. |
| Mills, Mabelle, | Amherst. |
| Mumma, C. H., | Holyoke. |
| Nickerson, Charlotte, | Amherst. |
| Ostrolenk, Theresa, | Amherst. |
| Pabodie, Mrs., | Hartwell, O. |
| Pabodie, Wm., | Hartwell, O. |
| Perry, Sylvia, | Amherst. |
| Peters, Thomas H., | North Truro. |
| Petersen, Anna K., | Everett. |
| Petersen, Ella O., | Everett. |
| Petersen, Lilian O., | Everett. |
| Phelps, Annie L., | Boston. |
| Potter, Sara E., | Roxbury. |
| Putnam, Chas. S., | Walpole, N. H. |
| Quint, Harry, | Roxbury. |
| Richards, J. L., | Brookline. |
| Roberts, Fanny E., | Brooklyn, N. Y. |
| Roberts, Jessie, | Kingston, N. Y. |
| Robinson, Mrs. A. M., | South Boston. |
| Robinson, Dr. M. B. (Miss), | Waltham. |
| Roys, Mabelle F. (Mrs.), | Boxford. |
| Roys, Rev. Edville A., | Boxford. |
| Seaverns, Annie W., | Jamaica Plain. |
| Shaw, Rev. Arthur W., | Goffstown, N. H. |
| Sherman, Frank M., Jr., | West Newton. |
| Sherman, Sara L., | Weston. |
| Sherrard, Evelyn B., | West Waltham. |
| Shumway, Ruth, | Amherst. |
| Simmons, Alva N., | Roslindale. |
| Sloane, Laura, | Amherst. |
| Smith, John F., | Berea, Ky. |
| Souther, Marguerite, | Jamaica Plain. |
| Strickland, Elinor, | Amherst. |
| Stutson, Miss P. B., | Columbus, O. |
| Sun, Y. Philander, | Worcester. |
| Sussman, Rudolf, | Sharon. |
| Story, Mrs. G. E., | Amherst. |
| Tobin, Ellen C., | Lawrence. |
| Tucker, Arabella H., | Worcester. |
| Vining, Roscoe H., | Ipswich. |
| White, Mrs. Ellen S., | Grove Hall. |
| Whitman, Adelaide, | Amherst. |
| Whitney, Jos. T., | Medford. |
| Williams, Guy F., | North Anson, Me. |
| Wiswell, Ralph A., | Newton Center. |

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